THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

Rooms—No. 39 Nassau Street, cor. Liberty Street, opposite the Post-Office, New York.

LONDON:—TRUBNER & CO., No. 60 PATERNOSTER ROW.

VOL. IV.—No. 61. NEW-YORK, TUESDAY, JULY 1, 1862. $3 PER ANNUM.

HERRING'S PATENT

Champion Fire-Proof Safes.

Herring's Champion Burglar-Proof Safes, with Herring & Floyd's New Patent Crystalized Iron, the only metal which cannot be drilled.

Nearly 25,000 Herring's Safes have been made and sold, and over 500 have passed triumphantly through accidental Fires, thus fully sustaining their acknowledged and well-earned character as the "best Fire-Proof Safes the world ever saw."

Herring's New Patent Burglar-Proof Safes, made of a combination of Wrought Iron, Patent Crystalized Iron, and Bars of Steel, are confidently offered to the public as the strongest and best security against skilful burglars now extant.

It was a "Herring's Burglar-Proof Safe," the public will remember, which so lately held secure its trust against the determined ingenuity of the boldest and greatest mechanical burglars this country has ever known, and saved for the New York Exchange Bank no less than

HALF A MILLION OF DOLLARS.

Herring's Patent Fire and Burglar-Proof Safes *combined*, (one Safe within another,) making the most perfect protection from fire and thieves now known.

FIVE OF HERRING'S SAFES VICTORIOUS!

WELLSBORO', Penn., December 21, 1861.

Messrs. Herring & Co., New York:

Gentlemen,—At the great fire which occurred here on the 18th December last, my store, with a number of other buildings, was entirely destroyed; no less than seven places of business were burnt out and five of your safes severely tested, in every instance saving their entire contents, to the complete and perfect satisfaction of the owners. Two of your Herring's Patent Champion Safes which were in my building remained there through the entire conflagration, and were not opened until the day after the fire. No water was thrown on the building. Everything in my safe after the fire was nearly as good as new. C. L. Wilcox also preserved all his books, papers, and money in two of your safes, both being in same fire. Wm. Roberts was also the fortunate owner of another of your Patent Champion Safes, which was severely tested, and saved completely his books, papers, and money. The result has given great satisfaction, and we want no safe but Herring's Champion. Please send me one same size I last bought of you immediately. Send by N. Y. & Erie R.R. via Tioga depot. JOHN R. BOWEN.

I had two of Herring's Safes in above fire. They saved my books, papers, and $2 000 *in bank bills.* C. L. WILCOX.

HERRING'S PATENT CHAMPION saved my books, papers, and about $400 in *paper money.* I would use no other. WILLIAM ROBERTS.

GREAT FIRE IN PEARL AND FULTON STS.

NEW YORK, Jan. 27, 1862.

Messrs. HERRING & Co., No. 251 Broadway:

Gentlemen,—The large HERRING'S PATENT CHAMPION SAFE you made for me a few years ago has been put to a severe test in the great fire corner Fulton and Pearl sts., on the 26th inst., which entirely destroyed my building, together with many others.

The fire commenced about 6 o'clock on Sunday morning, and the safe was taken from the ruins after an exposure of more than thirty hours.

Your Safe contained all my books, insurance policies, and other valuable papers besides, gold and silver, bank bills, coupon bonds, &c., amounting to over Two Hundred Thousand Dollars. Everything in the Safe is in perfect order, except the binding of the books being steamed.

Your Patent Champion Safe gives us great satisfaction, and has guarded safely through the fire every dollar of its contents.

Truly yours, A. S. FOSTER.

GREAT FIRE IN NEW JERSEY.

NEW BRUNSWICK, N. J., January 18th, 1862.

Messrs. HERRING & Co.,

No. 251 Broadway, New York:

Gentlemen,—At the recent extensive fire in our city, on Wednesday morning last, 15th inst., I was the fortunate owner of one of your HERRING'S PATENT CHAMPION SAFES, which contained some books and a number of valuable papers.

The heat in my store was very great, and the safe subject to an intense heat. I felt great interest in the safety of my papers, as a number of castings in my store and within a few feet of the safe were melted. Nothing, indeed, was saved in my building, except the contents of your safe, which I am happy to inform you was completely preserved, after a thorough roasting for some seventeen hours. The result has exceeded my anticipations, and fully confirmed my confidence in the security of your Herring's Patent Safe. Please send me another of larger size, and refer all incredulous to my books and papers, which it gives me great pleasure to show.

WM. H. ARMSTRONG.

Herring & Co., 251 Broadway.
Farrel, Herring & Co., Phila.
Herring & Co., Chicago.

IRON FOUNDRIES.

BERGEN IRON WORKS, Established 1833.

R. A. BRICK, Manufacturer of CAST IRON WATER and GAS-PIPES. RETORTS, PIPES, &c., always on hand. Office, 109 Leonard Street, New York.

S. V. MERRICK, J. VAUGHAN MERRICK, W. H. MERRICK.

SOUTHWARK FOUNDRY, Philadelphia.

MERRICK & SONS, Engineers, Manufacturers of every description of Gas Machinery.

Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gasholders, either TELESCOPIC OR SINGLE, WITH SUSPENSION FRAMES COMPLETE; Wrought Iron Roof Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam or Hand Air Pumps for proving Street Mains, Centre Seals, Governors, Wrought or Cast-Iron Lime Sieves for Purifiers, Purifier Hoisting Machines, &c. &c.

Address— MERRICK & SONS,
5th and Washington Streets, Philadelphia.

OREGON FOUNDRY, Nos. 740, 742, 744 Greenwich Street, New York.

HERRING & FLOYD, proprietors, manufacture Gas Compensators of all sizes, Self-Acting Valves, Exhausters upon an improved plan, costing less than half those of English manufacture, also castings of every description for Gas and Water Works.

Herring & Floyd offer for sale Sabbaton's Patent Screening Shovels for coke and coals, made of malleable iron, of all sizes; Sabbaton's Patent Improved Cast Iron Furnace Frame and Door, arranged to protect the iron work of the door and frame from direct contact with the fire; also, Floyd's Patent Malleable Iron Retort Covers, only quarter of an inch thick, but of convex form, and of great strength, as is attested by certificates from several of the leading Gas-works in America. For engravings of all the above patents see AMERICAN GAS-LIGHT JOURNAL for October, 1859, pages 65 and 71.

Samples of the above castings can be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

S. FULTON & CO., (Successors to Colwell & Co.) Manufacturers of Pig Iron and Cast Iron Gas and Water Pipes, also Heavy and Light Castings of every description, No. 207 North Water street and 206 North Wharves, Philadelphia.

SAMUEL FULTON, THEO. TREWENDT.

TRANER & MERCER, 117 NORTH Water Street, & 124 North Wharves, Philadelphia, AGENTS FOR THE MERCER FOUNDRY, AND ELK SHEET IRON WORKS.

CAST IRON STREET MAINS; *Bends, Branches, Chemical Retorts, and all kinds of Castings for* GAS-WORKS, either COAL or ROSIN WORKS. SHEET IRON FOR GASOMETERS *cut and punched to order.* BOILER IRON *of all descriptions.* RUSSIA SHEET IRON, TIN PLATES, BLOCK TIN, COPPER, PIG LEAD, SPELTER, and Metals generally.

FLORENCE IRON WORKS.—The subscriber is prepared to execute orders and make contracts for Cast-Iron Water and Gas-Pipes, from 2 inches to 48 inches in diameter; also, Retorts, Bench-Castings, Branches, Bends, and all Castings for Water or Gas-Works. Pipes and Castings coated with Smith's Patent Coal Tar Varnish to prevent corrosion.

JOSEPH G. JONES,
205½ Walnut Street, Philadelphia.

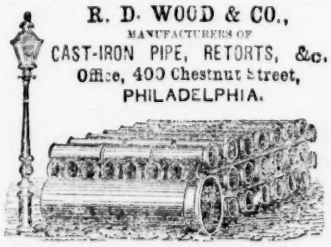
R. D. WOOD & CO.,

MANUFACTURERS OF

CAST-IRON PIPE, RETORTS, &c.

Office, 400 Chestnut Street,

PHILADELPHIA.



TO GAS AND WATER COMPANIES:

The undersigned, Agent for Messrs. Thomas Elington & Sons, Phœnix Foundry, Glasgow, Scotland, is prepared to contract for all descriptions of Cast-Iron Pipes of their manufacture.

About 6,000 tons of these Pipes have lately been supplied to the Brooklyn Water-works, N. Y., and the Chief Engineer of the Works, A. P. Kirkwood, Esq., is ready to testify to their excellent quality.

ARCHIBALD BAXTER, 28 Beaver St., N. Y.

Sole Agent for the United States and Canada

IRON FOUNDRIES.

MORRIS, TASKER & CO., PASCAL IRON WORKS,

[ESTABLISHED 1821.]

PHILADELPHIA, manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues,

GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works.; Cast-Iron Street Mains, Bends, Branches, Drips, &c.

GAS AND STEAM FITTERS' TOOLS, &c.

STEPHEN MORRIS, CHAS. WHEELER,
THOMAS S. TASKER, STEPHEN P. M. TASKER.

CAST IRON WATER, GAS, DRAIN AND HEATER PIPES, &c.,

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OFFICE, No. 46 NORTH SEVENTH STREET, Below Arch Street, Philadelphia.

THOS. M. ADAMS, Proprietor.

S. S. ASHCRAFT, CINCINNATI, O., Manufacturer of Gas and Water-Pipes, with Branches of every description; Retorts for Gas and Oil Works; Gasholder Stands, Columns, &c.; Gas Purifiers, Condensers, and Gas Apparatus of all kinds; Foundry Work in general.

N. B.—A complete selection of Patterns on hand. Refer to any of the Gas-Works in the Western and Southwestern States.

THEODORE SCOWDEN, Engineer, Louisville.
JOHN JEFFREY, Civil Engineer, Cincinnati.
JACOB HOUGHTON, Engineer, Detroit.

WARREN FOUNDRY AND MACHINE CO., Phillipsburg, N. J. Manufacturers of Cast-Iron Pipes, from 2 to 48 inch diameter, all pipes from 3 inch to 48 inch cast vertically, and in dry sand, in lengths of 12 feet. 2 inch pipes in lengths of 7 feet. Special Castings of all descriptions furnished at short notice.

REFERENCES.

Croton Aqueduct dept., N. Y.
Manhattan Gas Lt. Co., N. Y.
Brooklyn Water dept., N. Y.
Brooklyn Gas Lt. Co., N. Y.
Citizens' Gas Lt. Co., Brooklyn, N. Y.

CAST IRON PIPES.—EARL'S IRON WORKS, NEWARK, N. J., 91, 93, 95, 97 and 99 Chestnut Street. Branch Office, 21 Centre street, New York.

The subscriber continues to manufacture Superior Cast-Iron Gas and Water Pipes, Branches, Bends, Angles, Bevel Hubs, Reduces, Sleeves, Drip Syphons, Plugs, Caps, Retorts, Bench Castings, and Castings in general. Particular attention paid to all Castings connected with Gas-Works. E. B. EARL.

TO VERTICAL PIPE MANUFACTURERS.—WANTED, a situation as Foreman, or would prefer taking the work by contract, by a man that has had twenty years' experience in Vertical Pipe Moulding; also, has had some years' experience in Green Sand Moulding; best of reference given, by addressing FIRTH & INGHAM, Warren Foundry and Machine Shop, Phillipsburg, New Jersey.

GAS-HOLDERS.

GASOMETERS, RETORT-HOUSE ROOFS, WATER-TANKS,

PURIFYING-BOXES, COAL-CARS, COKE BARROWS,

AND ALL KINDS OF

WROUGHT-IRON WORK FOR GAS AND WATER WORKS.

Manufactured by GEORGE W. KRAFT, Chestnut street wharf, West Philadelphia, Pa.

POOLE & HUNT, BALTIMORE, MD., are prepared to execute orders for

GAS-HOLDERS,

IRON-ROOF FRAMING,

And all other descriptions of

Iron Work for Gas-Works, Water-Pipes, and Heavy Castings, and Machinery generally.

STOP-COCKS, &C.,

DANIEL THOMPSON, Machinist and Manufacturer of Stop-Cocks, Fire-Plugs, &c., for Water-Works, Stop-Cocks, Valves, Drip Pumps, &c. for Gas-Works, No. 133 Elfreth Alley, Philadelphia.

COAL-OIL & CANDLES.

THE LUTHER ATWOOD OIL COMPANY'S

DEODERIZED

ILLUMINATING OIL,

Unsurpassed by any KEROSENE manufactured. Is nearly COLORLESS, of a PLEASANT ODOR, and burns without smoke, or crusting the wick.

WARRANTED NON-EXPLOSIVE.

For sale in any quantity at a greatly reduced price.

Packed in cans and cases for foreign markets. Apply to U. TALLMAN,
34 Burling Slip, New York.

COAL OIL! COAL OIL!! of the celebrated brand of "SILVER SPRING." A superior burning oil, white, pure, safe, and odorless.

J. S. STANTON, Manufacturer,
No. 132 Maiden Lane.

A LAMP CHIMNEY THAT WILL not break.—Made for the million.

The patent Mica Chimneys for coal-oil Lamps possess many advantages over the glass chimneys. They do not break from the heat, falling, cleaning, or any ordinary usage. When one is purchased it will last, with care, as long as the lamp. They fit all the burners now in use.

AMOS HORNING,
Agent for Manufacturer,
No. 321 North Second st.,
Philadelphia.

N. B.—Coal-Oil Lamps and Coal-Oil at low rates.

PATENTED OCT. 8, 1861.

Dithridge's Patent

OVAL LAMP CHIMNIES,

for Coal-Oil burners. Manufactured of

XX FLINT GLASS.

These chimnies are intended for the flat flame which, heating all parts of the glass equally, does not expose it to cracking.

E. D. DITHRIDGE,
Fort PittGlass Works,
Pittsburg, Pa.

THE LOVERS' LAMPS.—Price Five Shillings ($1.25) each. To supersede Candles and Night Lights. No Dressing or Trimming required.

EDMUND SPILLER,
Patentee,
98 HOLBORN-HILL, LONDON.
Post-Office orders attended to.

Ambrose's
PATENT
COAL-OIL, NO-CHIMNEY BURNER,

For Portable LAMPS, LANTERNS, Etc. Requires no Chimney.

Address,
J. E. AMBROSE,
249 Pearl st.,
New York, or
45 Newark Av.,
Jersey City, N. J.

COAL OIL, FOR BURNING.—FINE quality, 40 to 50 cents per gallon, according to quantities. Dealers and consumers can obtain it at the above rates of XAVIER GEX, coal-oil refiner, 75 William street.

AGENTS.—TO ALL WHO USE Candles.—The Candle Lamp just out. Safety and economy in light. No excuse for using explosive fluids. No dropping of tallow on carpets. The Candle Lamp will be sent free on receipt of 25 cents. Agents, male and female, can make a larger profit, and find a quicker sale for the Candle Lamp, than any article yet offered to the public. Send red stamp for illustrated circular.

WM. SUMNER, 208 Broadway, (room No. 10,) N. Y. city.

THE

STERLING GAS-REGULATOR,

Improves the Light and Saves a Large Per Centage of Gas.

MANUFACTURED BY THE

WHEELER & WILSON SEWING MACHINE COMPANY.

It is well known that Printers require the best and most brilliant light In proof of the superiority of these Machines over all others, the following New York establishments are using them, and testify to their excellence:—New York Times, New York Herald, New York World, New York Tribune, New York Sun, Journal of Commerce, Courier & Enquirer, Evening Post, The Zietung, Dispatch, Leader, Scientific American, Advertiser and Spectator, Independent, Daily News, Harper's Monthly and Weekly, Transcript, Mercury, Atlas, Life Illustrated, Albion, Spirit of the Times, AMERICAN GAS-LIGHT JOURNAL, Christian Enquirer, Churchman, Church Journal, Christian Advocate, Christian Ambassador, Christian Intelligencer, Observer, Sunday Times, Sunday Courier.

By order of the New York and Brooklyn Common Councils, these Regulators are now used in the City Halls, Police Stations, Markets, and other Public Buildings in both cities.

They are Warranted by the

WHEELER & WILSON SEWING-MACHINE CO.,

505 BROADWAY, NEW YORK.

To keep in order, and always maintain the pressure of the Gas at the lowest point for a brilliant light and economical combustion. They are so constructed that *under no circumstances can the Mercury get into the Meters, or in any way injure them.*

WARREN'S PATENT WATER & ALARM GAUGE

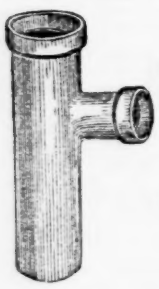
For Protecting the Flues and Preventing Steam-Boiler Explosions.

This is a reliable High and Low Water Detector, arranged so as to render it one of the best Water Gauges ever attached to a Steam-Boiler; always presenting before the Engineer at sight the exact height of the water, and if, by oversight or by sudden leakage, the water gets low in the boiler, it will cause an alarm before the water gets below the flues, thereby preventing an explosion. This Gauge can be made to alarm at any point desired as a High Water Detector, thereby preventing the water from getting to that height as to be forced into the cylinder of the engine, often causing serious accidents. Thus it is a High as well as a Low water Detector. For sale by

WARREN & BANKS,

153 Centre st., corner of Canal st., New York,

Where a Gauge is constantly in operation.



GAS, STEAM, SMOKE,

PURE WATER & SOIL PIPE,

FROM

JOSEPH CLIFF

Wortley Fire-Brick Works, Leeds, England.

T. W. PARMELE, Agt.,

No. 4 Irving Place, N. Y.

JOHN RUSSELL & CO.,

PATENT TUBE MAKERS,

THE OLD TUBE WORKS, WEDNESBURY, AND THE ALMA WORKS, WALSAL, STAFFORDSHIRE,

69 UPPER THAMES ST., & 5 CHARLES ST., SOHO, LONDON;

AND 35 GRANBY ROW, MANCHESTER, ENGLAND.

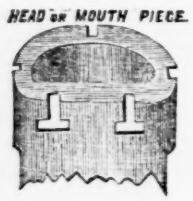
The original Manufacturers of WROUGHT-IRON GAS TUBES, and the Inventors of the Lap-welded Tubes for Locomotive and Marine Boilers. All kinds of TUBES and FITTINGS, whether for Gas, Steam, or Water Galvanized and Composition Tubes. Chandeliers, and every kind of Brass work for Gas and Steam.

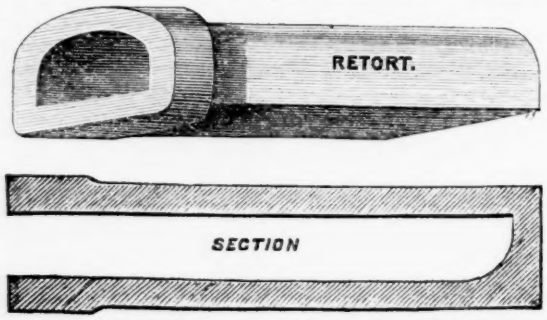
STOCKS, DIES, AND TAPS OF ALL SIZES. CAST-IRON PIPE AND GAS-METERS.

All Goo s Warrante .

KING BROTHERS,

STOURBRIDGE, ENGLAND, FIRE-BRICK AND RETORT WORKS.





KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them

Free from Cracks and Correct in Form.

By great care in Manufacturing, combined with the advantages in Burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

RETORT OVENS, FIRE-BRICKS, GUARDS, SADDLES, RABITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

EVERY RETORT AND BRICK IS BRANDED "KING BROTHERS, STOURBRIDGE."

Apply to E. W. BARSTOW, 83 Maiden Lane, New York, where samples can be seen.

HARRIS & PEARSON,

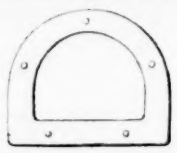
PROPRIETORS OF

Best Glass-House Pot & Crucible Clay.

Manufacturers of Fire-Bricks, Gas-Retorts, and Glass-House Furnace-Bricks of every description.

AMBLECOTE FIRE-CLAY AND BRICK WORKS, STOURBRIDGE, ENGLAND.

COWEN'S PATENT FIRE-CLAY RETORTS.



JOSEPH COWEN & CO.,

BLAYDON BURN, near Newcastle-on-Tyne, England,

Have always been, and are still, the most extensive manufacturers of FIRE-CLAY RETORTS in the United Kingdom, and were the only parties to whom a Prize Medal was awarded at the Great Exhibition, in London, 1851, for

"GAS RETORTS, AND OTHER OBJECTS IN FIRE-CLAY."

J. C. & CO. make Fire-Clay Retorts of all shapes and dimensions, and to fit existing mouth-pieces.

Orders for FIRE-CLAY RETORTS, TILES, BEARERS, and other articles in Fire-Clay, receive immediate attention, and are promptly executed at their Works, as above. Drawings of Settings adapted for Cowen's Patent Fire-Clay Retorts supplied.

AGENTS, MESSRS. MEAD & BELL,

13 CLIFF STREET, NEW YORK.

N. B.—J. C. & CO.'S RETORTS are well adapted for small Gas-Works, as they can be used without an Exhauster.

WHERE GAS-WORKS AND WATER-WORKS ARE WANTED.

We are now publishing regularly the names of the thirty thousand post-towns in the United States, so that builders of gas-works and water-works, and the various manufacturers, may see where are new openings for business. And as each post-master will receive several copies of the AMERICAN GAS-LIGHT JOURNAL, for distribution, the number thus circulated will probably exceed *Three Million Copies. What a chance for advertisers!*

POST-OFFICE TOWNS IN THE UNITED STATES,

ARRANGED BY STATES AND COUNTIES,

Showing where Gas-Works and Water-Works are Wanted.

TENNESSEE.

84 Counties, 1,004 Towns, 4 Gas-Works, 2 Water-Works.

(*Concluded from page 371, Vol. III.*)

Knox County.

Ball Camp,	Gallaher's	North Hope,
Beaver Ridge,	Gap Creek,	Racoon Valley,
Church Grove,	Kidd's Hill,	Roseberry,
Concord,	*Knoxville*, (c. h.,)	Thorn Grove,
Flint Gap,	McMillan,	Vandergriffs.
	Mecklenburgh,	

Lauderdale County.

Cane Bottom,	Dry Hill,	Leesville,
Cottage Hill,	Durhamville,	*Ripley*, (c. h.,)
Double Bridges,	Fulton,	Walnut Post.
	Golden's Ridge,	

Lawrence County.

Appleton,	Glen Rock,	Palo Alto,
Blanche,	Henryville,	Wayland's Springs,
Cass,	*Lawrenceburgh* (ch,)	West Point.

Lewis County.

Palestine,	*Newburgh*, (c. h.)

Lincoln County.

Boon's Hill,	*Fayetteville*, (c. h.,)	Millville,
Camargo,	Gas Factory,	Molino,
Cane Creek,	George's Store,	Mulberry,
Charity,	Gill's Store,	Norris' Creek,
Chesnut Ridge,	Goshen,	Oregon,
Cordova,	Kinderhook,	Petersburgh,
County Line,	Lynchburgh,	Pleasant Plains,
Craighead,	Marble Hill,	Robinson's Store,
Cyruston,		Viney Grove.

Macon County.

Alton Hall,	Eclipse,	Meadorville,
Brooks' Tan Yard,	Eulia,	Puncheon Camp,
Echo,	La Fayette,	Red Boiling Springs.

Madison County.

Andrew Chapel,	Denmark,	Mount Pinson,
Centre,	Gadsden,	Poplar Corner,
Cotton Grove,	*Jackson*, (c. h.,)	Spring Creek.
	Medon,	

Marion County.

Cheeksville,	*Jasper*, (c. h.,)	Running Water,
Crown Point,	Looney's Creek,	Walliden's Ridge,
Dunlap,	Nicojack,	Walnut Valley,

Marshall County.

Belfast,	Farmington,	Mooresville,
Berlin,	Globe Creek,	New Hope,
Caney Spring,	Holt's Corner,	Spring Place,
Chapel Hill,	*Lewisburgh*, (c. h.,)	Tyrone.
	Medium,	

Maury County.

Ashwood,	Hardison's Mill,	Rally Hill,
Beard's Store,	Hopewell,	Santa Fe,
Bigbyville,	Hurt's Cross Roads,	Silver Creek,
Cartersville,	Isom's Store,	Spring Grove,
Columbia, (c. h.,)	Mount Pleasant,	Spring Hill,
Cross Bridge,	Pleasant Grove,	Union,
Hampshire,		Williamsport.

McMinn County.

Athens,	Fountain Hill,	Mount Harmony,
Calhoun,	Hamilton Cross R'ds,	Oxford,
Cantrell's Cross R'ds,	Jalapa,	Pine Ridge,
Cog Hill,	Middlebrook,	Riceville,
Facility,	Middle Creek,	Rodgers' Creek.

McNairy County.

Adamsville,	Hatchie,	Mud Creek,
Anderson's Store,	Monterey,	*Purdy*, (c. h.,)
Chawalla.	Montezuma,	Rose Creek,
Gravel Hill,	Morse Creek,	Stantonville.

Meigs County.

Decatur,	Kincannon's Ferry,	Pine Land,
Goodfield,	Moore's Cross Roads,	Sewee,
Kelly's Ferry,	Mouth of Hiwasee,	Ten Mile Stand.

Monroe County.

Ball Play,	Four Mile Branch,	Philadelphia,
Belltown,	Hiwasse College,	River Side,
Chota,	Johnston's Mill,	Rockville,
Citico,	Madisonville,	Sweet Water,
Coker Creek,	Mount Vernon,	Tellico Plains,
Coytee,		Towee Falls.

Montgomery County.

Clarksville, (c. h.,)	Oakwood,	Port Royal,
Daley's,	Onecho,	Richardson's,
Fairmount,	Palmyra,	Ringgold,
Fredonia,	Peacher's Mills,	Sailors' Rest,
McAllister's Cross R'ds	Pea Ridge,	Woodford,
New Providence,	Pleasant Mound,	Woodlawn,
New York,	Poplar Spring Iron Works,	Yellow Creek Furnace.

Morgan County.

Crooked Fork,	*Morgan*, (c. h.,)	Pine Top,
Glades,	Owl Hill,	Sagefield.

Overton County.

Fox Spring,	Mount Pisgah,	Oak Hill,
Hillham,	Mouth of Wolf,	Oakley,
Livingston, (c. h.,)	Netherland,	Olympus,
Locust Shade,	Nettle Carier,	Walnut Grove,
Monroe,		West Fork.

Obion County.

Clover Lick,	Mason Hall,	Silver Top,
Fremont,	Mount Prospect,	*Troy*, (c. h.,)
Jacksonville,		Union City.

Perry County.

Beardstown,	Cedar Grove Furnace,	Lobelville,
Britt's Landing,	Linden,	Wood's.

Polk County.

Bell's Mill,	Copper Mines,	Ocoa,
Benton.	Ducktown,	Parksville,
Brush Creek,	Higdon's Store,	Springtown,
Canasauga,	Kimsey's Store,	Wetmore.
	Lonsville,	

Putnam County.

Bear Creek,	Byrne,	Falling Water.
	Cookville,	

Rhea County.

Big Elm,	Prestonville,	Sulphur Springs,
Lake,	Smith's Cross Roads,	*Washington*, (c. h.)

Rome County.

Barnardsville,	Hackberry,	Paw Paw Ford,
Belleville,	Hope's Creek,	Post Oak Springs,
Cross Keys,	*Kingston*, (c. h.,)	Tabor,
Emory Iron Works,	Lenoir's,	Welcker's Mill,
Erie,	Loudon,	Wood's Hill,
Gray's Hill,		Wrightsville.

Robertson County.

Barren Plain,	Millersville,	Sadlersville,
Black Jack,	Mitchellsville,	Slaydensville,
Cherry Mount,	Red River,	*Springfield*, (c. h.,)
Coopertown,	Rose Hill,	Thomasville,
Cross Plains,		Turnersville.

Rutherford County.

Carlockville,	Jordon's Valley,	Milton,
Fosterville,	Las Casas,	*Murfreesboro*, (c. h.,)
Hall's Hill,	La Vergne,	Readyville,
Independent Hill,	Middleton,	Smyrna,
Jefferson,		Versailles.

Scott County.

Fort Brandon,	Horse Shoe Bend,	Pouch Creek,
Good Water,	*Huntsville*, (c. h.,)	Winfield.
	Clarsboro,	

Sequatchie County.

Newberry.

Sevier County.

Boyd's Creek,	Henderson's Spring,	Sevierville,
Cannon's Store,	Henry's Cross Roads,	Trundle's Cross Roads
Fair Garden,	Pigeon Forge,	Walden's Creek,
Gatlinburgh,		Wear's Cove.

Shelby County.

Arizona,	Germantown,	Jessamine,
Big Creek,	Green Bottom,	*Memphis*, (c. h.,)
Colliersville,	Hagan's Landing,	Morning Sun,
Cuba,	Hazel Flat,	Nashville,
Delta,	High Hill,	*Raleigh*, (c. h.,)
Fisherville,		Sulphur Well.

Smith County.

Bagdad,	Dixon's Springs,	Montrose,
Bairdsville,	Gibb's Cross Roads,	New Middleton,
Carthage, (c. h.,)	Goose Creek,	Peyton's Creek,
Chesnut Mound,	Gordonsville,	Pleasant Shade,
Convenient,	Jenning's Fork,	Rome.
	Lancaster,	

Stewart County.

Big Rock,	*Dover*, (c. h.,)	Lineport,
Bowling Green,	Great Western,	Magnolia,
Caleb's Valley,	Hope,	Mint Springs,
Cumberland Iron Work,	Indian Mound,	Standing Rock,
	Iron Mountain,	Tobacco Port,

Sullivan County.

Arcadia,	Fordtown,	Morrell's Mill,
Beaver Creek,	Gott's Cross Roads,	Paperville,
Blountsville, (c. h.,)	Hilton's,	Piney Flats,
Campbell's Rest,	Holston Valley,	Poor Hill,
Clover Bottom,	Kingsport,	River Bend Forge,
Eden's Ridge,	Mill Point,	Rockhold's,
Edgeworth,		Union Depot.

Sumner County.

Beech.	*Gallatin*, (c. h.,)	Rockhouse,
Castalian Springs,	Gretna Green,	Saundersville,
Enon College,	Hanna's,	Trammel,
Fountain Head,	Hartsville,	Tyree Springs.
	Hendersonville,	

Tipton County.

Bloomington,	Mountain,	Randolph,
Covington,	Mount Zion,	Sharon.
	Portersville,	

Union County.

Big Barren Forge,	Lost Creek,	*Maynardville*, (c. h.,)
Cedar Ford,		Woodbourne.

Van Buren County.

Mill's Branch,	South Rock Island, *Spencer*, (c. h.)

Warren County.

Caney Fork,	McMinnville,	Rocky River,
Clearmont,	Morrison,	Rough and Ready,
Increase,	Mountain,	Trousdale,
Irving College,	Pine Bluff,	Viola.

Washington County.

Blue Plum,	Falls Branch,	Knob Creek,
Boon's Creek,	Flag Pond,	Leesburgh,
Broylesville,	Freedom,	Locust Mount,
Buffalo Ridge,	Indian Creek,	Longmire,
Cherry Grove,	Johnson's Depot,	Swingleville,
Clear Branch,	*Jonesboro'*, (c. h.,)	Washington College,
Cox's Store,		West's Store.

Weakley County.

Alma,	Dresden,	Mount Pelia,
Black Oak,	Dukedom,	Old Hickory,
Boydsville,	Elm Tree,	Pillowville,
Cedar Hill,	Fleming's,	Poland Springs,
Dedham,	Irvine's Store,	Winston.
	Locust Grove,	

White County.

Bon Air,	Clarkstown,	Newark,
Bon Air Springs,	Claysville,	River Hill,
Calf Killer,	Cumberland Institute,	Rock Island,
Casaville,	Dry Valley,	Solon,
Cave,	Frank's Ferry,	*Sparta*, (c. h.,)
	Green Tree,	

Wayne County.

Ashland,	Factor's Fork,	Sorby,
Carrollville,	Houston,	Victory,
Clifton,	Middle Cypress,	*Waynesborough* (c.h)
Craven's Mills,	Patriot,	Whitaker's Bluff.

Williamson County.

Arrington,	Christiana,	Leiper's Fork,
Barren,	Eagleville,	Nolensville,
Basin Spring,	*Franklin*, (c. h.,)	Peytonsville,
Bethesda,	Good Spring,	Rizg's Cross Roads,
Boston,	Jordan's Store,	Thompson's Station,
Brentwood,	Lake Creek,	Triune.

Wilson County.

Big Spring,	Harricane,	Rural Hill,
Cainsville,	Huddleston's Cross R'ds,	Shop Spring,
Cherry Valley,	Laguarda,	Silver Spring,
Commerce,	*Lebanon*, (c. h.,)	Statesville,
Cross Rock,	Lockport,	Three Forks,
Gladeville,	Mount Carmel,	Tucker's Cross R'ds,
Green Hill,	Oak Retreat,	Watertown.
	Round Top,	

CARBURETTED GAS IN LONDON.

In a late number of the *Journal of Gas-Lighting* we find the following editorial reference to the complaints against the street lamps, where the carburetting process is being tried:—

The complaints against the feeble light of the street lamps in the city to which the carburetting process is applied, have been considered since our last, at meetings of the Commissioners of Sewers, and the matter has been referred to the General Purposes Committee. It appears to be generally admitted, that the light given by many of the lamps to which the process is applied, is much inferior to that of the 5 feet burners, when the gas is not so treated, and in several instances, the light has been so feeble, that the lamps have been extinguished. The "Carburating Company" attribute the defective light to the insufficiency of the supply of gas, and assert that, in a large number of the lamps to which their process is applied, the Great Central Company supply much less than the 3 feet per hour contracted for. We have made inquiries on the subject, and find that the deficiency of gas complained of, arises entirely from the obstruction to its passage through the naphthalizing apparatus. We understand that nearly one inch of pressure is lost in passing through the carburetting boxes, and that when they are removed, there is an abundant supply. In several instances, we are informed, in which the light was very dim, on the removal of the boxes the flame rose to a height of twelve or fourteen inches. The accident we mentioned as having occurred from a defect in one of the tin naphtha cases fixed near the burners of the street lamps, was not a solitary instance. There have been three similar accidents; and the danger arising from the use of extremely volatile hydrocarbons, was exemplified in a startling manner, in a lecture delivered by Dr. Lyon Playfair, at the Royal Institution, on the 8th inst. In the course of his lecture on gas illumination, Professor Playfair was endeavoring to illustrate the light-giving power of hydro-carbons, and, for that purpose, he passed a quantity of pure hydrogen through a small glass vessel containing naphtha. The gas bubbled up through the fluid, and, when he thought sufficient had passed to expel the atmospheric air, he applied a light to the tube, when a violent explosion ensued. The glass vessel was shattered, and fragments of it were thrown in all directions, cutting the faces of several of the audience, and filling the lecture room with dense suffocating vapor, which drove a large portion of the company away. If that accident could happen in the application of naphtha by an experienced manipulator like Dr. Lyon Playfair, it is evident that such highly inflammable material cannot safely be trusted in the hands of ordinary workmen, to be applied even to the street lamps, without considerable danger.

[The gas carburetting apparatus may, under certain circumstances, be dangerous, but the occurrence above referred to, is no illustration of it. The explosion would have taken place had *no* naphtha at all been in the glass, having been undoubtedly due to a mixture of atmospheric air and hydrogen. All that we have to say in the matter is, that the professor was very careless in not allowing sufficient time to elapse for the expulsion of the air, before applying a light to the apparatus. Every tyro in chemistry is familiar with the principle involved in the action, and the well-known toy—the hydrogen gun is frequently used in popular lectures, to illustrate the explosive force with which hydrogen and oxygen combine, when mixed in the proper proportions.—ED. AM. GAS-LT. JOUR.]

WATER-WORKS OF AMERICA.

JERSEY CITY, N. J.

We have received the fourteenth report of the Board of Water Commissioners of Jersey City, N. J. From the interesting report of Mr. R. C. Bacot, the superintendent and engineer to the Board, we abstract the following statement:

The consumption of water has been 390,384,029 gallons. The daily average consumption is shown to have been 2,120,893 gallons. The engine has worked 1,617 hours, 56 minutes, delivering 404,933,344 gallons of water.

The new pumping engine, erected under the contract with the late William Birkbeck, was, on the 23d of September last, put in motion by the engineer, at the request of the administrator of the estate of Mr. Birkbeck, and worked at intervals for the purpose of securing the proper adjustment of the different parts of the machinery.

On the 2d of November the engine commenced pumping, and continued to do so regularly, until the 20th of the same month, when a crack having been discovered in the lower pump-valve chest, the engine was stopped, and the contractor notified to provide a new casting. During the time the engine was worked, its operation was highly satisfactory.

By the terms of the contract, the engine is required to perform a duty equal to raising sixty million of pounds of water one foot high, with 100 pounds of coal.

The consumption of coal has been greater during the last, than the previous six months, owing to the working of both engines at times, and the low tides in the river, which have made frequent stoppages necessary during the past four months. A saving of over $2 per day in the cost of fuel has, however, been effected by the admixture of one-third of anthracite pea-coal, with two-thirds of the bituminous coal heretofore exclusively used.

ENGINE-HOUSE AND GROUNDS.

A two-story brick building, 15 by 17 feet, has been erected on the east side of the engine-house, the lower story designed to be used as a blacksmith's shop, for the repairing of tools, &c., and the upper story communicating with the main floor of the engine-house, as a store-room for oils and other articles.

The road-front of the engine-house grounds, has been enclosed with a neat picket fence, and the sidewalks, &c., graded. The dwellings occupied by the engineers and firemen, have been substantially repaired and repainted. The gutters of the engine and boiler houses will require to be changed from their present position as soon as practicable. The slating of the roofs should be renewed at the same time.

PIPE-BOX.

With the view of protecting the piers of the pipe-bridge against dangers from floating ice during the winter, two additional piles have been driven opposite, and about ten feet distant from each row of piers; the heads of the piles were afterwards drawn over, and firmly spiked and braced to those of the bridge. In this position, they serve to break up large masses of ice coming in contact with the piers, and also give additional strength to the whole structure. The fender-guards are now supported from pier to pier, the intervening piles and timber which served only to impede the flow of ice, having been entirely removed.

RESERVOIRS.

During the past summer repairs and additions have been made, as follows:

At the Receiving Reservoir—The gate-house has been taken down, and entirely rebuilt from the water-table—the brick-work being laid up with hydraulic cement, and the form of the roof changed, to one better adapted to the exposed situation of the building.

At the Distributing Reservoir—The wooden beams and flooring of the gate-house, which had become entirely decayed, have been replaced with a floor of blue-stone, supported by cast-iron beams. Openings in the floor, covered by perforated iron gratings, afford the necessary access to the pipes and stop-cocks beneath. From the embankment of the reservoir to the screen-house, a light wrought-iron foot-bridge, of 45 feet span, and 5 feet wide, has been thrown across, and the temporary timber structure removed.

The fences of both reservoirs have been painted with two coats of coal-tar paint, a composition found well adapted from its cheapness and durability for the purpose.

These repairs have all been made in the most substantial manner, and add much to the good order and neat appearance of these important portions of the works.

The masonry and earthwork of the reservoirs are in excellent condition.

MAINS AND DISTRIBUTING PIPES.

A contract for furnishing 10,000 feet of cast-iron pipe, 36 inches in diameter, intended to form a portion of an additional main between the reservoirs, has been made with the Warren Foundry and Machine Company of Phillipsburgh, N. J., at the rate of $37 per ton of 2,240 pounds. This price is $13 per ton less than that paid for similar sized pipe at the time the works were built.

The pipes will be cast in lengths of 12 feet 4 inches, making an important saving in the cost of the lead joints over the 9 feet lengths heretofore used. They are to be delivered early in the ensuing spring, and will be laid from the Belleville Reservoir, eastwardly, along the side of the present 20-inch main, and be connected with it at its termination, by a special casting made for the purpose.

In September last, it became necessary, from the grading of Montgomery avenue by the authorities of Hudson City, to lower the 26-inch pipe at this point, and also for a distance of about 260 feet in Madison avenue. A temporary 20-inch pipe was therefore laid around these points, and the 26-inch pipe taken up, to allow the required excavation of rock to be made.

To accomplish this change, the supply of water in the city was shut off on the night of the 31st of August last, for about eight hours; the work being done at night, after due notice given, occasioned little or no inconvenience to the citizens. It showed, however, the necessity of an additional line of pipe between the reservoir and the city—the disturbance of large pipes of the kind being often attended with much delay and liability to accidents. The re-connection of these pipes has already been done.

The covering of the 20-inch main on the meadows west of the Hackensack river was almost entirely carried away during the storm and high tides of November last. The damage was immediately repaired, and the pipe properly protected for the winter.

The amount of distributing pipe laid in the city since July last, has been 1,994 feet, viz: 1,334 feet of 6-inch, 510 feet of 4-inch, and 100 feet of 3-inch pipe; 100 feet of this was cast-iron pipe, and 1,844 feet wrought-iron and cement pipe; five additional fire hydrants and seven stop-cocks have been erected. A few trifling leaks have occurred in the distributing-pipes during the last six months, principally at points where the streets have been made over meadow grounds.

WATER METERS.

At the date of the last report, partial results only had been obtained from the system of supplying water by meters to consumers of large amounts of water. By the month of August, meters were placed and in operation on every establishment in the city using more than the ordinary supply; the number and sizes of these meters, and their location, are shown in the annexed table, marked "C."

The check upon a portion, of the extravagant use of water, is seen by the tabular statement marked "A," in which the daily consumption from 2,434,213 gallons in July is reduced, in the following month of August, to 2,067,404 gallons; in September to 1,938,873 gallons, and in October to 1,784,014 gallons—a result notwithstanding during this time the distribution of water was largely extended.

The reserve in the distributing reservoir increased from the month of August, when all the meters were in operation, to the month of December, nearly twenty million of gallons. A portion of this gain is no doubt attributable to several important leaks discovered by the use of the meter.

It is evident, however that a considerable amount of the unnecessary use of water by large consumers is now completely under the control of the Board, while the revenue derived from this class of consumers shows a steady and remunerative increase.

There is no question, from the facts elicited by this partial application of the system of measuring water, that, could the system be extended to all classes of consumers, the original estimate of supply deemed sufficient by the projectors of these works, viz., 30 gallons for each inhabitant, would be found very nearly correct. All the meters set have been protected from liability to freeze, during the winter, by enclosing them with a wooden box packed with hay.

SEWERS.

The main sewer in South Seventh street, from Newwark avenue to the present water-line, at the east side of Prospect street, with its laterals, has been completed.

Provision has been made for cleaning out the lateral sewers, by building man-holes in them at convenient distances, similar to those of the main sewer. The instances of partial stoppages, which have occurred in some of the lateral sewers heretofore constructed without these openings, shows this to be necessary to their usefulness.

The depths and other requirements of the sewerage plan have been strictly carried out in the building of this sewer. When extended to the waters of the Mill creek, the water-run of the sewer will be 18 inches below medium high tide in the creek, and when produced to Hudson street, will discharge one foot below low water, enabling the main sewer to be flushed by salt water through its entire length. The imperfect drainage of parts of the First, Second, and Third wards by the sewer in Henderson street, and its connecting sewers in Wayne, York, and Gregory streets, and a portion of Newark avenue, has been, for a long time past, a subject of great complaint by residents and property owners on those streets. The outlet of this Henderson street sewer is through a syphon under the Morris canal, discharging into the Cove or Communipaw bay. For want of a sufficient head of water in the sewer to keep the syphon free, an accumulation of the sewerage matter takes place in it, causing its frequent stoppage, and consequently the backing up of the water and its discharge into the cellars and premises of those connected with the sewer.

It is, therefore, important for the health of residents in this part of the city, that a plan should be soon adopted, whereby a proper discharge of the surface and sewerage waters can be obtained. The plan which is deemed by Mr. Bacot to be the only effectual one is the construction of a main sewer through York street, according to the depths and grades of the general sewerage system, from the Hudson river to Henderson street, to be extended westwardly to the waters of the Mill creek, whenever the wants of that part of the city require its extension. The sewers in Henderson ar l the adjacent streets will thus be entirely relieved, and discharge freely into the waters of the Hudson river.

This arrangement will render necessary the taking up of the present old sewer in York street, from Henderson street to the Hudson river, and, if extended to the Mill creek, the small pipe sewers now laid to Jersey avenue.

To enable an assessment of the cost of this sewer to be made upon the property benefitted by this improvement, legislative aid will be required.

MISCELLANEOUS.

By the appointment of the Board, Mr. R. S. Osburn, of Jersey City, took charge of the pumping engine and works at Bellville, on the 13th of August last, as first engineer, and has, with his assistants, performed the duties of that position with entire satisfaction. The care shown by him in keeping the machinery and engine-house, grounds, &c., in a neat and orderly condition, evinces a proper regard for the good order and preservation of the works under his charge.

During the last two years the operations of the works have been largely extended in the city and vicinity, requiring increased demands upon the services and exertions of those engaged in the various departments of supervision or labor. No addition, however, has been made to the force heretofore regularly employed, and it has so far been rendered unnecessary by the energy and faithfulness of the present employees in the discharge of their various duties. The valuable services of Mr. James Flemming, the water purveyor, are particularly acknowledged in the supervision of repairs and his skillful arrangement and management of the water meters, now in operation throughout the city.

The reports of the registrar exhibit accurate statements of the financial operations of the Board from the commencement of the works, and also for the past six months, in which the receipts and expenditures on account of the works, and for the construction of sewers, are shown under their distinct and appropriate heads.

Semi-Annual Statement of Receipts and Expenditures on Account of the Jersey City Water and Sewer Works, from July 1st, 1861, to January 1st, 1862.

1862. RECEIPTS.

January.

Balance as per statement, July 1st, 1861		13,977 11
From Jersey City Water Loan, (sale of 6 bonds of $1,000 each)		6,000 00
From Water Rents (arrears 1855–1856)	51 25	
" Water Rents (arrears 1856–1857)	8 06	
" Water Rents (arrears 1858–1859)	69 20	
" Water Rents (arrears 1860–1861)	1,461 28	
" Penalty " " "	227 67	
" Interest Penalty " "	151 21	
" Advertising Arrears "	38 31	
	1,878 47	
" Water Rents (1861–1862)	10,894 29	
" Penalty " " "	436 66	
" Interest Penalty "	03	
	11,330 98	
" Measured Water to Factories, Foundries, &c.	2 646 68	
" Measured Water to Cunard Steamers	800 00	
" Measured Water to Steamboats	838 98	
" Measured Water to Ferries and R. Rds.	1,884 21	
" Receipts from Shipping	300 00	
" Street Sprinkling, &c	40 00	
" Suspense Account, Balance	52 82	
" Corporation of Jersey City Account (balance)	1,331 89	
" Water Rents from Hoboken City	8,400 30	
		29,632 84
FROM SEWER ASSESSMENTS, VIZ:		
From Sewer in South 3d Street and Laterals	81 38	
" Sewer in South 5th Street do	261 52	
" Sewer in Grand Street do	245 78	
" Sewer in Wayne Street, Newark and Railroad avenues	10,776 66	
" Bills Payable for Sewerage, &c	8,077 05	
" Sewerage Account	130 46	
	19,572 85	
		$69,182 80

1862. EXPENDITURES.

January.

For Interest Coupon Account		22,230 00
MANAGEMENT AND REPAIRS.		
Repairs and Additions to Pumping Engine	110 16	
Repairs and Improvements at Engine House	927 11	
" " at Bergen Hill Reservoir	1,345 52	
" " at Belleville Reservoir	793 98	
Repairs to Pipe Box at Hackensack River	592 29	
Repairs and Improvements at Passaic River	104 62	
Repairs and Management of Stopcocks and Hydrants	292 82	
Pipe Repairs Account	318 12	
Fuel for Pumping Engine	6,197 26	
Oil and Tallow for Pumping Engine	245 39	
Engineer and Fireman's Wages	1,275 50	
Horse and Wagon Account	85 18	
Labor in Pipe Yard	129 49	
Service Pipe Account	186 11	
Stand Pipe Account	58 03	
	12,571 58	
For Office Expenses, Stationery, Books, &c., and Rent	753 93	
For Incidental Expenses, Taxes, Ins., &c	1 384 85	
	2,138 78	
Mechanics and Traders' Bank (Balance of Account due them January 1st, 1861)		1,405 47
For Water Rents, 1857–1858		20 19
FOR SALARIES, VIZ:		
Superintendent and Engineer	1,000 00	
Registrar	633 34	
Water Purveyor	375 00	
Messenger and Clerk	125 00	
Printer and Attorney	458 35	
	2,591 67	
FOR EXTENSION OF THE WORKS.		
For Extension of Iron Pipe	1,895 33	
For Extension of Cement Pipe	1,733 89	
For Extension of Pipe Laying	578 62	
For Extension of Stopcocks and Hydrants	643 94	
For Water Meters	4,324 22	
For New Pumping Engine Account	1,150 75	
For Pipe Yard in Provost street (purchase)	3,718 50	
	14,045 25	
Interest on Sewer Loans	2,286 04	
Sewer on South 7th street and Laterals	10,955 12	
Culvert and Basin, corner Newark avenue and South 6th street	33 97	
Culvert and Basin, corner York and Warren streets	15 06	
	13,290 19	
Mechanics and Traders' Bank, Balance	670 41	
Registrar's Bank Balance	31 40	
Cash Account, Balance on hand January 1st, 1862	187 86	
	889 67	
		$69,182 80

TABLE A.

Showing the quantity of Water pumped and consumed from July 1st, 1861, to January 1st, 1862.

YEAR AND MONTH. 1861.	Time Worked. H. M.	Strokes of Pump.	Gallons of Water.	Lbs. of coal pumping time.	Lbs. of coal for keeping steam.	Monthly consumption in Gallons.	Consumption per day.	Height of water in Distributing Reservoir.
July	297 30	147,384	75 460,608	193,930	20 140	75,460,608	2.434.213	121. 3
August	275 33	136.556	69 916,672	176,800	18,600	64,089,547	2,067,404	122.11½
September	250 30	125,037	64,018,944	164,700	18,400	58,166,194	1,938,873	124. 8
October	254 30	124,238	59.321 056	189,950	15,100	55,304,456	1.784 014	125.10
November	271 05	131.245	67,197,440	189.200	19,500	61,901,800	2 163.393	126. 6
December	268 48	134 802	69,018,624	187,428	20,100	62 461,424	2,337,465	125. 6
	1,617 56	*799,362	404,933.344	1,102,008	111,840	390,384,029	Av. 2,120,593	

* 8 28 per minute.

TABLE B.

Statement of Pipe Work connected with Jersey City Water-Works.

Pipes.	36 in.	26 in.	24 in.	20 in.	16 in.	12 in.	10 in.	8 in.	6 in.	4 in.	3 in.	Total.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
Previous to July 1st, 1861	2,743	3,420	96	38,472	2,861	14,874	885	512	84,624	8.805	2,883	160,175
To January 1st, 1862									1,334	510	100	1,944
	2.473	3,420	96	38,472	2.861	14,874	885	512	85,958	9,315	2,983	162,119

Total length of Pipe laid, 30 miles, 3,719 feet.

Stopcocks and Hydrants.

STOPCOCKS AND HYDRANTS.	STOPCOCKS. 36 in.	26 in.	24 in.	20 in.	16 in.	12 in.	6 in.	4 in.	3 in.	HYDRANTS.
Previous to July 1st, 1861	2	2	0	13	4	22	124	9	11	237
To January 1st, 1862							2	1	4	5
	2	2	0	13	4	22	126	10	15	242

TABLE C.

Statement showing the number and sizes of Water Meters now in use by the Jersey City Water Works, to January 1, 1862.

WHERE APPLIED.	SIZES OF METERS. 3 in.	2 in.	1 in.	¾ in.
Railroads and Ferries.				
New York and Erie, Water Tank, Provost street	1			
" " Machine Shops, "		1		
" " Engine House, North 3d street	1			
" " Passenger Station, Hudson street	1			
" " Ferry Boats and Houses, Pavonia avenue	1			
" " Paterson Depot, Greene street	1			
New Jersey Railroad and Transportation Company, Depot and Depot Slip, Hudson street	1			
" " " " Engine House, Washington street	1			
" " " " Work and Car Shop, "			1	
Jersey City Ferry Company, Ferry Boats and Houses, Montgomery street	2	1		
" " Ferry Yard, York street		1		
Docks and Piers.				
Delaware, Lackawanna and Western Railroad Company, Coal Docks, Essex street	1			
Scranton Railroad Company, " "	1			
American Coal Company, " Grand street		1		
Hudson County Dry and Wet Dock Company, South 7th street		1		
Foundries and Manufacturing Establishments, &c.				
Jersey City and Hoboken Gas-Light Company, Tanks, &c., South 3d street			1	
Jersey City Locomotive Works, Machine Shops, Warren street		1		
" " " Tire Works, Morgan street				1
Jersey City Pottery, Shops, Essex street				2
New York Railroad Chair Works			1	
Hudson River Cement Company, Bay street				1
Patent Water and Gas Pipe Company, Greene street				1
Ætna Steel Works, Warren street			1	
J. H. Gautier & Co., Crucible Works, Greene street			1	
Howell & Birdsall's Boiler Works, Morris street				1
Moore's Oil Factory, "				1
Barrow's Oil Factory, Washington street			1	
H. I. Baker & Co., Oil Factory, "			1	
Heinrichs, Sommer & Co., Oil Factory, South 8th street				2
Van Syckle's Oil Factory, " "				2
John Rodgers, Oil Factory, " "				1
Lyddon & Yeni, Oil Factory, Greene street			1	
Henry F. Cox, Grove Street Brewery, Grove street		1		
James Wallace, Distillery, Prospect street			1	
Hoffman & Curtis, Distillery, Provost street		1		
American Mills, Washington street			1	
Battelle & Renwicks, Chemical Works, Wayne street				1
Thomas Andrews & Co., Saleratus Works, Morgan street			1	
Fairbanks & Co., Scale Works, Greene street				1
Hope Mills, Spice Works, Hudson street				1
Colgate & Co., Starch Factory, Railroad avenue		1		
Colgate & Co., Soap Works, York street			1	
Henry Steele & Sons, Iron Foundry, Wayne street				1
Colwell's late Birkbeck's, Iron Foundry, Greene street			1	
Cobb & Fields, Iron Foundry, "				1
Winslow Ames Spike Works				1
James Udall, Treenail Works				1
Culver, Simonds & Co., Foundry				1
David Kemp, Foundry, Steuben street				1
J. L. Blackmore, Foundry, "				1
Knight & Crawford, Cement Pipe Works, South 8th street				1
Crissman & Durbin, Rolling Mill, Prospect street			1	
William Cummings, Car Works, Washington street				1
Willard Derby, Planing Mill, Greene street				1
McGraw & Co., Planing Mill, "				1
George Mathews' Sons, Ink Factory, South 3d street				1
Lanterback & Sons, Tannery, South 6th street				1
White & Chilvers, Cement Pipe Works, South 8th street				1
Mrs. Newberry, Laundry, North 1st street				1
Hotels, Tenement and Private Dwellings.				
Taylor's Hotel Buildings Exchange Place			1	2
Darcy House, Restaurant and Offices, Hudson street			1	1
Mrs. Valentine, Boarding House, Essex street				1
B. O. Edge, Three Tenement Buildings, Essex street				1
J. R. Wortendyke, Dwelling, Jersey avenue				1
Charles Fink, " Washington street				1
D. E. Culver, " Grand street				1
R. C. Bacot, " Jersey avenue				1
Meters out of the City Limits.				
Roemelt & Leicht, Brewery, Hudson City			1	
R. H. H. Steele, Laundry, "			1	
William O. Davey, Oakum Works, "			1	
Mrs. Cable's Laundry, Lafayette				1
I. B. Hervey's Laundry, Belleville				1
R. S. Swords, Dwelling, "				1
	11	9	19	42
Meters on hand not yet set			1	11
(93) Total Number of Meters	11	9	20	53

The following are the officers of the Jersey City Water-Works:

Board of Water Commissioners.

J. R. Wortendyke, *President.*

Ephriam Pray, Delos E. Culver,
Benj. O. Edge, J. B. Romar.

Superintendent and Chief Engineer.

R. C. Bacot.

Registrar.

G. S. Boyce.

Water Purveyor.

James Flemming.

WATER-RATES IN DETROIT.

The following circular has just been issued to the water-takers of Detroit, Mich.:

Office of Water-Works,
Detroit, May 12, 1862.

The attention of water-takers is respectfully directed to the following amendment in the ordinances of the Board of Water Commissioners:

It being satisfactorily shown to the commissioners that the kind of water-closet known as the "Hopper closet" requires about nine times as much water to do the same service as those known as the "pan closet," they have deemed that the public interests demanded that such a discrimination should be made in the rate to be charged for water used in them, that it will amount to an inhibition of connecting Hopper closets with the pipes of the works hereafter, and that the rate to be charged for water used in such already connected should bear some proportion to the quantity used and uselessly wasted. They, however, indulge the hope that those having such closets will deem it for their—as it certainly will be for the public—interest, to take them out and substitute the pan closets in their places. Should any, however, prefer to procure water meters to be attached to their fixtures by which the quantity of water actually consumed could be ascertained, this would be mutually satifactory, and they would be required to pay only for the quantity used. And it is believed that if water consumers would affix meters to all their fixtures for supplying water it would be to the mutual benefit of themselves and the public interest, for they would then be required to pay only for the quantity of water they actually consumed, no more water would be allowed to pass through the meter than was required, and the useless and unnecessary waste by leaks and otherwise (which it is estimated exceeds one-half of the quantity pumped by the works,) would be stopped. Meters of sufficient capacity for ordinary families, it is believed, would be furnished by plumbers for from $20 to $25. The assessed rates are graduated to meet the requirements for the maintenance of the works, and are meant to be as nearly according to the quantity of water consumed as possible, and while it is admitted that any method of assessing rates must be unequal in that the prudent and economical consumer must be taxed for the extravagant and useless waste of water by others, the board know of no corrective except the adoption by water-takers of the course above indicated—the application of meters to their fixtures—when they would only be charged for what they chose to use.

A common practice has obtained, where fixtures are not properly secured against frost, of suffering water to run to waste continually during the cold season. This practice, during the past winter, increased the consumption of water about three hundred thousand gallons per day, which is regarded by the board as an unnecessary and useless waste that ought not to be permitted. They, therefore, give this timely and seasonable notice, that those interested may secure such fixtures from frost, that it will not be permitted in future; and whenever it occurs hereafter, without express permission and payment therefor, the supply of water will be withheld from the premises where the same occurs.

Robert E. Roberts, Secretary.

An Ordinance to amend chapter two (2) of the Ordinances of the Board of Water Commissioners of the city of Detroit, made and adopted January 30th, 1861.

Sec. 1. Be it ordained by the Board of Water Commissioners of the city of Detroit, that from and after the thirtieth day of June next, the rates of water assessments in said city of Detroit shall be as follows, viz.: For every family keeping house, consisting of not more than three persons, and occupying not more than five rooms, five dollars per annum; for every family of four persons, and occupying not more than six rooms, six dollars; for a family of five persons, and occupying not more than seven rooms, seven dollars; for a family of six persons, and occupying not more than eight rooms, eight dollars; for a family of seven or eight persons, and occupying not more than ten rooms, nine dollars; for a family of nine or ten persons, and occupying not more than twelve rooms, ten dollars, and one dollar for each additional person over ten, and fifty cents for each additional room occupied over the number designated respectively, provided, however, that the assessor may, if he is satisfied that a full assessment of any family, according to the foregoing rates, would be oppressive, set down the same at such rate as he may deem just and proper, subject to the approval of the board, provided, that the sum assessed shall in no case be less than five dollars per annum.

For bathing apparatus, for a family consisting of not more than four persons, two dollars per annum, and fifty cents for each additional person having accesss to their use.

For water closets known as the "pan closet," three dollars per annum for a family consisting of not more than four persons, and one dollar for each additional person having access to their use; and for closets known as the "Hopper closet," six dollars per annum for a family consisting of not more than four persons, and two dollars for each additional person having access to their use. Closets situated in hotels, stores, offices, &c., the rate shall be as follows: For pan closets one dollar, and for Hopper closets two dollars per annum for each person having access to their use. The foregoing rates for Hopper closets are fixed for such only as are now connected with the works. Any such closets hereafter so connected, will not be supplied with water from the works except on the payment for the whole estimated quantity of water required in their use.

For urinals, not less than two dollars per annum.

For permanent wash-hand basins, with waste-pipe, twenty-five cents for each person having access to their use.

For permanent wash-tubs, with waste pipe, two dollars per annum for a family consisting of not more than four persons, and twenty-five cents for each additional person.

For garden hose, not less than three dollars, or more than ten dollars per annum.

For street sprinklers, not less than three dollars, or more than ten dollars per annum.

For each carriage horse, one dollar and fifty cents per annum; cart or work horse, one dollar per annum

For each cow, seventy-five cents per annum.

For each double carriage, one dollar; single carriage, fifty cents.

For fountains, special rates.

MISCELLANEOUS.

For stores and offices, from two to twenty dollars per annum.

For mechanics' shops, without engines, from two to ten dollars per annum.

For foundries, machine shops, mechanic shops, printing offices, and other places where engines are used, one and a half cents per barrel meter measure.

For hotels, boarding-houses, bakeries, soap factories, fountains, asheries, gas-works, breweries, smith shops, etc., one and a half cents per barrel meter measure.

For livery stables—for each horse, one dollar and fifty cents per annum; and each carriage, cab, or omnibus, one dollar per annum, or one and a half cents per barrel, meter measure, at the option of the board.

For public baths—for each tub, five dollars per annum, or one and a half cents per barrel meter measure, at the option of the board.

For gardens, without hose, special rates.

For building purposes—for each thousand brick, five cents; for each perch of stone, one and a half cents; and for each one hundred yards of plastering, thirty cents; whenever it shall be ascertained, by meter or otherwise, that the quantity of water used upon any premises shall amount to a greater sum, at a rate not exceeding one and a half cents per barrel, than the amount assessed for water delivered upon such premises, this board reserves the right to cause the same to be re-assessed by the collectors, and charged for according to the quantity of water taken at the rate above stated.

It shall be the duty of all persons who may desire water from these works for the purpose of clearing drains, flushing vaults, making skating ponds, or for any other purpose whatever, not included in their annual ascessed rates, before using the same, to make application, in writing, to the secretary, for permission to do so, accompanied with an estimate of the quantity required, and pay therefor at the rate of one cent per barrel. Any person using water for any purpose whatever, in violation of this section, upon conviction, shall be subject to a penalty not exceeding one hundred dollars and costs of prosecution; and it is further ordained, that when statements are made of the quantity of water used, the secretary may, in his discretion, require the same to be made under oath.

Sec. 2. It is further ordained, that the provisions of the first section of this ordinance shall not impair, affect, or rescind the existing by-laws and ordinances of this board in regard to the collection of water-rates which have already been assessed, or which may be assessed, on or before the said 30th day of June next, as to all which the existing ordinances shall continue in force until the said rates are fully paid or collected.

Made and passed by the Board of Water Commissioners of the city of Detroit, this twelfth day of May, A. D. 1862.

E. A. Brush, President.

Attest: Rob't E. Roberts, Secretary.
May 17, 1862.

POISONOUS EFFECTS OF CARBONIC OXIDE.

By H. Letheby, M.B., M.A., Ph. D., &c.

A good deal of misapprehension seems to prevail respecting the poisonous action of carbonic oxide. On the one hand, accidents have somewhat recently occurred, where, in all probability, the effects of the gas were entirely overlooked; and, on the other, fatal consequences have been unjustly attributed to it. Some of this confusion is due to the circumstance that our standard works on poisons and medical jurisprudence have either omitted the subject entirely, or have discussed it in very meagre language. The recent catastrophe at the Hartley Colliery, and the remarks which have been published respecting the supposed influence of the gas in causing the death of the men, have created an opportunity for a re-examination of this question.

Carbonic oxide was discovered by Priestly long before the close of the last century; and, in 1802, Clement and Desormes, at the instance of Goyton Morveau, undertook a careful examination of its properties. They not only proved its chemical nature, but they also ascertained that it was a poisonous gas. Birds put into it dropped dead before they could be taken out; and, when the experimenters themselves attempted to breathe it, they were attacked with giddiness and faintness. This experiment was repeated by Sir H. Davy, in 1810, who says that, when he took three inspirations of it, mixed with about one-fourth of common air, the effect was a temporary loss of sensation, which was succeeded by giddiness, sickness, acute pains in different parts of the body, and extreme debility; some days elapsed before he entirely recovered. It is, he says, fatal to animal life.

About the same time, the researches of Nysten demonstrated that the gas was capable of producing great disturbance of the system, when injected into the veins; and, although he concluded that the effects were of a mechanical nature, yet the accounts which he has given, prove that the gas is a dangerous poison.

Later still, in 1814, the two assistants of Mr. Higgins, of Dublin, made experiments with it upon themselves; and, in one case—that of Mr. Wilter—with almost a fatal result. Having exhausted the lungs of air, he inhaled the pure gas three or four times, and was suddenly deprived of sense and volition; he fell upon the floor, and continued in a state of perfect insensibility, resembling apoplexy, and with a pulse nearly extinct. Various restorative means were employed, but without

success, until they resorted to the use of oxygen, which was forced into his lungs, and then his life was restored; but he was affected with convulsive agitation for the rest of the day. He suffered, also, from violent headache, stupor, and a quick, irregular pulse. Even after mental recovery, he suffered from giddiness, blindness, nausea, alternate heats and chills, and irresistible sleep. The other gentleman, after inhaling the gas two or three times, was seized with giddiness, tremor, and incipient insensibility. These effects were followed by languor, weakness, and headache, of some hours duration.

Since those experiments were made, others of a more extended character were instituted by Tourdes, and by Leblanc. Tourdes found that rabbits were killed in seven minutes when they were put into a mixture of one part of the gas, with seven of atmospheric air. A fifteenth part of the gas in common air killed them in 23 minutes, and a thirtieth part, in 37 minutes. Leblanc's experiments were made in conjunction with Dumas, and he ascertained that 1 per cent. of the gas in atmospheric air would kill a small dog in a minute and a half; and that birds were killed immediately in a mixture containing 5 per cent. of it.

Very recently, I have myself ascertained that air containing only 0.5 per cent. of the gas, will kill small birds in about three minutes, and that a mixture containing 1 per cent. of the gas, will kill in about half this time. An atmosphere having 2 per cent. of the gas, will render a guinea-pig insensible in two minutes; and, in all these cases, the effects are the same. The animals show no sign of pain; they fall insensible, and either die at once, with a slight flutter—hardly amounting to convulsion—or they gradually sleep away, as if in profound coma. The post mortem appearances are not very striking: the blood is a little redder than usual, the auricles are somewhat gorged with blood, and the brain is a little congested. In birds, there is nearly always effusion of blood in the brain; and it may be seen through the transparent calvaria by merely stripping off the scalp after death.

Accident has also demonstrated how injurious the gas is, even to the human subject. For many years past, attempts have been made to promote the use of water-gas as an agent of illumination. The gas sometimes contains as much as 34 per cent. of carbonic oxide. It is obtained by passing steam over red hot charcoal; and, as the steam is decomposed by the ignited carbon, the hydrogen is set free, and carbonic oxide, with carbonic acid, is produced. Patents for this process of manufacturing gas, date as far back as the year 1810; and they have, at various times, been put into operation in this country, and on the continent. Selligue, in 1840, obtained permission to use the gas in the towns of Dijon, Strasburg, Antwerp, and two of the faubourgs of Paris and Lyons. At Strasburg, an accident occurred, which put a stop to its use. The gas escaped from the pipes into a baker's shop, and was fatal to several persons; and, not long after, an aëronaut, named Delcourt, incautiously used the gas for inflating his balloon. He was made insensible in the car; and those who approached to render him assistance, fainted and fell likewise. The use of the gas has, therefore, been interdicted on the continent.

Another source of danger from it is the combustion of carbon. It is found in the neighborhood of brick-kilns and furnaces. The gases discharged from the latter contain it in large proportion. Iron furnaces produce it to the extent of from 25 to 32 per cent., and copper furnaces from 13 to 19 per cent. In the year 1846, M. Adrien Chenol was anxious to ascertain the properties of the gas yielded by his process of smelting zinc ores with carbon; and, not having a suitable instrument for collecting the gases, he attempted to draw them out of the furnace by means of a pipette. Some of the gas was thus inhaled, and he fell immediately, as if he had been stunned; the eyes were turned back in the orbits, the skin was discolored, the veins were swollen, and presented a black tint under the skin; there were violent pains in the chest, and the brain felt powerfully oppressed. After removal to the open air, and the application of restoratives, sensibility gradually returned; but the internal pains were still severe, and there was a feeling of suffocation. For several days, he felt oppressed and languid; the digestion was bad, sleep was obstinate and heavy, and it was frequently disturbed by cramps in the knees and toes. Even for months afterwards, there was a morbidly excited state of the nervous system.

In a more diluted condition, the gas is still able to exert an injurious action; and it is very probable that the singular catastrophe which happened at Clayton Moor, near Whitehaven, in the summer of 1857, was caused by the diffusion into the air of carbonic oxide, from the neighboring iron furnaces. There is a row of cottages near to these furnaces, where, in the month of June, 1857, a number of persons were suddenly seized with insensibility, which soon passed, in some cases, into coma and death. About thirty persons were thus attacked, and six of them died. The effects were attributed at the time to the escape of sulphuretted hydrogen from the slag on which the cottages were built; but it is more probable they were caused by the oxide of carbon from the furnaces.

Lastly, it is worthy of remark that, very recently, Boussingault has noticed that the leaves of aquatic plants give off carbonic oxide and marsh-gas, when under the influence of solar light; and he asks whether this gas so produced may not be concerned in the unhealthiness of marsh districts?

A more complete acquaintance with the effects of this poison is a great desideratum, although enough is known to indicate its general mode of action, and to furnish evidence for its discovery.—*London Lancet.*

THE PETROLEUM QUESTION.

The great fire in Brooklyn to which we referred on page 376 of our last volume, has stirred up quite a feeling of alarm in that city, and as we have before intimated, measures have been taken to prevent similar catastrophes in future by the passage of ordinances regulating the storage of petroleum. In pursuance of a resolution adopted at a late meeting of the Brooklyn Councils, the sub-committee of the Joint Fire Department Committee consisting of Aldermen Strong, Belknap, and Green, held a meeting at the City Hall, on Saturday evening, June 14th. This meeting was convened for the purpose of hearing the testimony which those parties interested in the trade might have to offer.

Hon. Henry C. Murphy appeared as counsel for the parties affected by the ordinance, and introduced Professor A. K. Eaton, as a practical chemist. Professor Eaton's acquaintance with the subject under consideration was more practical than scientific. In reply to questions propounded by Alderman Belknap, of the Committee, he said that petroleum was not liable to spontaneous combustion; naphtha will not explode in a liquid state; naphtha in form of gas, mixed with air, is liable to explode, not otherwise; if confined, it would act like any other gas—expand; naptha gas proper, is lighter than air; there is but little of it left in petroleum after expsure to the air, unless taken directly from the well; there is, perhaps, 30 or 40 cubic inches in a barrel—but this was merely a rough estimate; the gas is carburetted hydrogen; the lighter parts of the oil were more inflammable than others, but the others are not; there is no ether in the gas; no benzine is obtained from petroleum; naphtha is obtained, but benzine is a fancy or fictitious name; the oils obtained from petroleum have never been named by chemists; benzine is a light oil, obtained where coal-tar is distributed; there is no ammonia in petroleum. The solid parts of petroleum, he said, were paraffine, white and almost impossible to decompose, boiling point, 800°; second, heavy oil; third, carbolic acid, analagous to kreosote. It was the acid that produced the peculiar odor. There is only a trace of nitrogen to be found. It was only the lightest portion of the oil that would burn in water. A gentleman present (Mr. Mowbray) at this juncture stated, that the next morning after the recent fire in Williamsburgh, some of the petroleum oil scattered on the water at that time, he saw seven or eight miles from the fire, up the East River. Prof. Eaton said there was no danger whatever of explosion, if the petroleum was stowed in open sheds; even if the outside of the barrel was on fire, it would not explode.

Mr. Mowbray, a practical chemist, and largely interested in the petroleum business, here presented the following statement of the parts of crude petroleum:

	Parts.
Naphtha, Benzine or Benzole, technically "Light Ends,".....	15
Light oil, specific gravity 60° to 55°.....	12
Light illuminating oil, specific gravity 54° to 50°.....	10
Medium illuminating oil, specific gravity 49° to 46°.....	25
Heavier illuminating oil, specific gravity 45° to 40°.....	20
Heavy oil, precipating paraffin 1.3 when exposed to temperature of 40° Fahrenheit.....	12
Loss.....	6
Total.....	100

Mr. Murphy, for the purpose of getting some clearer answers upon some points, put several questions to Professor Eaton, who was understood to make the following answers: That petroleum is not, as an oil, spontaneously combustible; the gases that escape under natural action, as when passing from wells to tanks, are lighter than air; this gas will explode when mixed with air; will not explode more than any ordinary gas—it is the same thing as used in nearly every house; the oil would be safe in open sheds; the gas generally used in houses is more dangerous than refined oil, and not so much as petroleum; the oil is less dangerous than camphene, and still less dangerous than burning fluid—the traffic in which is not regulated by any laws.

Here a gentleman stated that the explosion some time ago, at the foot of Smith street, when two men lost their lives, was caused by the distillation of coal tar, and had nothing whatever to do with petroleum. It was also asserted that the cause of the recent explosion at the foot of North Second street, was by striking a match in the forecastle of the lighter loaded with petroleum, where the gases were confined; in the same manner that the ordinary illuminating gas, used in every house, would explode if a person enter a room or cellar filled with it, with a light.

It was stated that petroleum that will not explode in a saucer by applying a lighted match,—would not explode in a lamp.

Mr. Mowbray gave all the information he had acquired about petroleum, substantially corroborating the statement of Prof. Eaton. Mr. L. B. Page introduced some experiments to show that some oils are more dangerous at a low gravity than others at a high gravity, and therefore the ordinance which requires that all the oil kept on hand must be under the specific gravity of 100°, was not a correct basis to secure the end desired. For this purpose, an instrument invented for the purpose, by Mr. G. Tagliabue, No. 298 Pearl street, New York, and called a Pyrometer, was introduced and placed upon the table. The apparatus consisted of a cup of water in which is inserted another cup of the capacity of three ounces. Into this the bulb of a thermometer is inserted, to indicate the degree of heat generated by a spirit-lamp placed directly under the cup containing water. The first experiment was with refined oil, at 50° Beaumé. When the thermometer indicated 118°, the oil commenced to vaporize, so that it would catch fire from a lighted paper; but it was not until 124° had been reached, that the oil itself would take fire, when a burning paper was applied.

The second experiment was with refined oil, at 43°, which took fire at 97°.

Mr. Page then turned a small quantity of burning fluid into a saucer, and applied a lighted paper. A slight explosion was the result, and the fluid burned freely.

Mr. Murphy addressed the committee briefly, merely to call attention to the importance of encouraging all business in which large capitals were used, so far as it could be done in safety; and contended that it had been shown that the oils affected by the ordinance in question, were not so dangerous as other illuminating oils and mixtures, in common use, without any regulations whatever; still, the gentlemen engaged in the traffic in petroleum, were willing and anxious that the business should be transacted under proper restrictions, and he believed that through a competent inspector, the end desired would be attained. The oil dealers present expressed themselves as perfectly willing to submit to the appointment of an inspector, so that all danger could be guarded against.

One gentleman present said that the ordinance had already materially affected the oil business. On account of that ordinance, the railroad companies had refused to carry the oil, and in place of receiving 1,500 barrels arriving a day, as he did when the ordinance was passed, he now did not receive more than 1,500 barrels a week.

At this stage of the proceedings, the committee adjourned.

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PROPRIETOR, JOHN B. MURRAY. | EDITOR, C. ELTON BUCK.

TUESDAY, JULY 1, 1862.

Whether the remarkably low price at which petroleum is now sold will eventually tend to its adoption in the place of coal for the manufacture of gas, we are not prepared to say. But judging from the desire exhibited by a large number of gas companies, particularly those situated in small country towns, to examine into its merits, and to fully test its economic qualities, a conclusive demonstration that it will answer all reasonable demands for gas making appears to be a consummation devoutly hoped for. The experiments which are being tried with petroleum, and the conviction which is being forced upon the minds of gas-engineers throughout the country, that in order to successfully compete with kerosene oil, the price of gas must come down, point to the use of this natural product as likely to be effected, partially at least, so as to place gas-light within the reach of the poorer classes of the community. There is no reason in officers of gas companies ignoring the fact that the public have determined to have gas-light at lower price than that heretofore charged; or if this be not allowed them, it is difficult to foretell the result of the controversy which will undoubtedly ensue. In order therefore, to be prepared for any emergency, it would be well for gas-engineers to examine the qualities of petroleum, or any other material offering similar advantages, and see whether it may not, in a great measure, be depended upon for producing a gas of high illuminating power, and withal of so low a cost as to run a successful competition with kerosene, which is the chief source of opposition which gas companies have to fear.

The principal objections heretofore urged against the use of petroleum, are, that it makes a gas of so high a degree of illuminating power as to prohibit its use in ordinary coal gas-burners. It is so rich in carbon as to give a smoky flame unless consumed in small burners, and it has been feared that the limited amount of gas which would be consumed in the event of these small burners being resorted to, would diminish the quantity sold to so great a degree as to render the business unprofitable, particularly when compared with the acknowledged profit now attending it. Whether this would be the practical result remains to be seen. Some are disposed to doubt it and are not backward in declaring that the effect would be that relatively more light would be used, and the same amount of gas be burned even by former consumers, while the apparent advantages which would present themselves to economical consumers would be such as to induce an accession of customers, and thus the companies would be gainers rather than losers by the operation. All this, however, is mere conjecture, and no such predictions can be relied upon.

Another objection attending the use of petroleum as a source of gas, is the great care required in the management of temperatures during its carbonization. If the heat in the retort be too low, a large quantity of liquid hydrocarbons are liable to pass over, and to condense in the pipes and thus cause trouble and loss. This difficulty has been encountered by many experimenters, but it may be easily overcome by attention, and should the result above mentioned ever occur when working on a large scale, it would only be a proof of a want of care on the part of those having the retorts in charge.

From indications which have recently come under our notice, it appears that the use of petroleum for gas-making is being largely increased. Already a number of small gas-works are employing it as a sole source of illumination, and as the price of the crude article is remarkably low in comparison with former rates, the temptation to try its merits becomes stronger.

The interest in the subject of water-gas seems to be again on the increase. The reason of this is undoubtedly to be attributed to the desire for cheaper gas than that now sold, which feeling is manifested all over the country. But while the friends of the SANDERS water-gas seem to be lying on their oars, new parties appear on the field, and with processes combining the alleged advantages of petroleum and water-gas, are already creating a stir in the gas world—a sphere of by no means insignificant extent. The processes patented respectively by AUBIN and GWYNNE are in practical operation in several towns, and we have been assured, afford a successful vindication of the light-giving power of decomposed steam and the hydrocarbons resulting from the carbonization of petroleum. At White Plains, N. Y., where the process of Mr. GWYNNE is in operation, the results are said to be alike gratifying to the company and consumers, and the works have been visited by a number of gentlemen connected with other gas companies, with a view of examining the practical operations of the process, and to determine on the propriety of introducing it into their establishments.

We are aware that among gas-engineers of the old *regime*, faith in water-gas is deemed heterodox in the extreme; and hence the violent opposition which has been accorded to all processes into which the utilization of the vapor of water enters. Be this as it may, skepticism is not less blind than faith; and to ignore or reject the consideration of a proposition merely from prejudice is a perversion of that spirit of intelligence which should lead to the impartial examination of new ideas. From this narrow-minded habit of thinking—or rather jumping at conclusions—many valuable processes have been branded with the opprobrious epithet "humbug," but which subsequent examination have proved to be of great importance. In making these remarks we do not enter the arena as champions of the water-gas, or even offer to plead for its being allowed a hearing. But believing that nothing should be condemned unheard; and being convinced that a true spirit of philosophy would prompt investigation instead of a hasty condemnation; and further, thinking that the future well-being of gas companies depends very much upon a reduction in the present average price of coal-gas, we deem it but fair that any new process claiming to ameliorate the objections now urged against gas as an illuminator, should be candidly studied, and its merits, if it have any, acknowledged.

There is no doubt but that many and valid reasons exist for this indisposition which is generally felt to examine into the merits of new inventions. Inventors are often so exceedingly suspicious, and fearful that their discoveries may be taken from them, that their actions are frequently construed into a distrust of their own process. In taking out patents, too, so strong is the desire to secure a large reward, that in many instances claims are made for professed improvements which have not the remotest semblance of truth. The grasping disposition of some inventors has doubtless tended to prejudice the public against their schemes. But where an open statement is made, and investigation is courted, and something more than a mere promise given; and where the result, if consummated, would prove advantageous, surely a fair investigation would not only be proper, but is due alike to the interests of all who are directly or indirectly concerned in the production or use of the article in question.

DISCOURTESIES OF GAS-LIFE.—We heard the other day of an instance of severe practice upon a respectable citizen residing in the upper part of the city, which we give as it was reported to us.

A gentleman residing in, we will say, Twenty-first street, had been for some years taking gas from the Manhattan Gas-Light Company under a strict compliance with all its rules and regulations. In April last he notified the Company of his intention to remove to, we will say, Twenty-sixth street, and requested that on and after a certain day the supply of gas might be stopped in Twenty-first street and continued in Twenty-sixth street.

A bill for gas consumed in the new residence, amounting to four dollars and twenty cents, was rendered early in June, with a verbal notice that it must be paid by the following Thursday, when the collector would call for the amount; the word "Thursday" being written upon the bill in pencil for a "reminder," as the lawyers call it.

The eventful "Thursday" came on the 5th of June, but the servant had forgotten to deliver the bill or the message—the collector loomed up, big with consequences, and went off without his $4 20, saying that the gas would be turned off at once. On Friday, the 6th of June, the bill and message were delivered to the gentleman, who forgot all about the matter until the following Tuesday, 10th, when he called at the Company's office, and paid the bill.

On reaching home that evening he found the threat had already been made good, *for the gas had been shut off on that very day.* Indignant at this treatment, the gentleman complained in a note to the Company, when he was informed that it was his own fault, for he had not only not paid his bill on the day designated by the collector, nor for several days afterwards, but he had also not called and signed the requisition of the company to supply the gas.

To the first count of the indictment the unfortunate plead "guilty," but offered in extenuation of the second, that having signed the required papers years ago for a supply in Twenty-first street, and having requested, in writing, that the supply be transferred to Twenty-sixth street, he conceived that the last notice carried with it all the obligations of the first.

It is hardly necessary to add that no satisfaction was obtained, other than a renewal of the supply of gas on the next day, after sufficient penance had been done by the culprit.

The gentleman referred to is one of our first citizens, and president of a monied corporation, whose position in society is at least equal to that of any gas officer or director in this city, or any other.

We don't exactly like this *brusque* style of doing business. It is true there are but two gas-light companies in New York at present, and each is supreme in its own district, and each is powerful and rich, but they must not push their power too far.

Their principle, if carried out, would justify a customer to go in with a revolver and demand of the president "his gas or his blood." It is no argument to say that the rule is universal, and applies equally to the refined and the low-bred. As well might we insist that social courtesies should be equally general,

that the hat should be raised, or the hand extended, to the rowdy as to the gentleman, because both are of the same race, or live in the same town.

The application of such rules to respectable families is indefensible, inexcusable, intolerable, and every way unjustifiable, and we are quite satisfied that if the President had been aware of it he would not have permitted it in this instance, as it should never be permitted, in any case, without his written sanction first had and obtained.

PRESIDENT ROOME AT THE WAR.—Col. Charles Roome, President of the Manhattan Gas-Light Company, is now at the seat of war at the head of his regiment, the 37th New York Volunteers. This regiment we have already spoken of as having been raised upon a nucleus furnished by the men in the employ of that Gas company, and the company itself gave five thousand dollars towards equipping it as a Home Guard. The Manhattan Gas Company are evidently determined to "shut off the gas" of the rebels, and leave their pipes buried deep in the ground, "away, away, in Dixie."

WHO IS MR. ARTHUR BROWNE?—A letter arrived in this country from England by a recent steamer, addressed—

Care Mr. CHARLES MARTYN,
Secretary Gas Company,
U. S. America.

(For Mr. ARTHUR BROWNE.)

It is post-marked "Westport, July 6, '62;" also, "Newport Mayo, July 6, '62."

The Post-Office delivered it to the New York Gas-Light Company, who sent it to us. The question now presents itself—"Of what gas-light company is Mr. CHARLES MARTYN the secretary?" and "Who is Mr. ARTHUR BROWNE?" The letter will be delivered to either on demand. The writer of this letter evidently thought the "U. S. America" a village with one gas company in the centre of it. This is a fair sample of the impression of America held by the mass of the English people, and what is more strange, they don't care to be better informed. The British Government have been of the opinion, until lately, that "U. S." was "small potatoes," but it begins to find out that it is "some pumpkins." It will be confirmed in this latter discovery if it attempts to play any pranks with "U. S." But who owns the letter?

THE ELECTRIC LIGHT.—M. Nadau has recently succeeded in obtaining a series of singular and interesting views of the catacombs of Paris, by illuminating them with the electric light. In the French department of the International Exhibition in London there are some photographs printed by the aid of this light.

THE OZONE LIGHT.—A new light has been patented in England by Messrs. Trachsel & Clayton, which they call the Ozone light. The Ozone light is clear and white, and it is said that all colors are seen by it in their true shade. It is produced by passing a current of air through a small box containing a chemical compound. The gas which escapes from the box and gives the light is said to be non-explosive; its cost is about the same as ordinary gas. With a carriage in motion a sufficient current is produced to cause a constant manufacture and supply of the gas. If it is desired to produce a stationary light, a pressure is produced by clockwork and weights. The cost of the apparatus for buildings would be from £12 to £14; and there would be also required an occasional renewal from the inventors of the liquid wherein their secret lies. The illuminating power of this light, as compared with gas, has not yet been ascertained.

EVANS' APPARATUS FOR GENERATING GAS.

Mr. F. J. Evans, of the Chartered Gas Company of London, has invented a new apparatus for generating gas, of which we present some illustrations, and the accompanying explanation of the process from the London *Engineer*. The object of this invention is to expedite the manufacture of gas, and effect an important economy both in the details of the process and in the construction of the apparatus. For this purpose, instead of using the ordinary horizontal retorts, Mr. Evans uses a vertical retort of large capacity and of peculiar construction enclosed within a furnace or oven and surrounded by a heating flue, which leads from the fireplace, and rises spirally around the retort until it reaches the exit opening to the chimney. Fig. 1 shows the gas-generating apparatus in vertical section; Fig. 2. is a vertical section, taken at right angles thereto; Fig. 3 is a top or plan view; and Fig. 4 is a sectional plan taken in the line of 1, 2, of Figs. 1 and 2.

A A is the retort, which may be constructed of fire-clay or of iron, protected by a fire-clay covering on its outside, as shown. This retort is enclosed in a furnace, and it is made by preference, of an oval form in cross section, as shown at Fig. 4, and corrugated vertically on its inner surface. A slight taper towards the top is also given to the retort, in order that it may better discharge the coke after the illuminating gases are distilled therefrom. The retort is closed at the top with a cast-iron cover C, which is formed with a valve-seat for receiving a drop-valve or plug *a*, and projecting from the side of the cover is a pipe *b*, leading to the hydraulic main. The drop-valve *a* is used for covering the opening by which access is gained to the interior of the retort for supplying coal thereto, which may be discharged into the retort (until it is nearly full) from wagons run upon a level with the top of the furnace. The lower end of the retort inclines downwards, as shown at Fig. 1, and extends to the outside of the furnace. It is closed by a door *c*, like the ordinary horizontal retorts, and similar means to that ordinarily adopted, are used for securing the door in position, and making it air-tight. A small crane *d* mounted in front of the furnace, serves to facilitate the operation of applying and removing the door *c*; D is the fireplace of the furnace, the heat from which is caused to circulate by means of a spiral flue E around the retort, and heat it equally. The gases of combustion make their exit near the top part of the retort into the main flue, and thence to the chimney; *e*, *e*, *e*, are sight-holes, made in the walls of the furnace to enable the operator to observe the degree of heat of the retort, and to give access to the flue for the purpose of cleaning out the same. The discharge of the coke, when the coal has been carbonized, is effected at the outlet *f*.

FIG. 1.

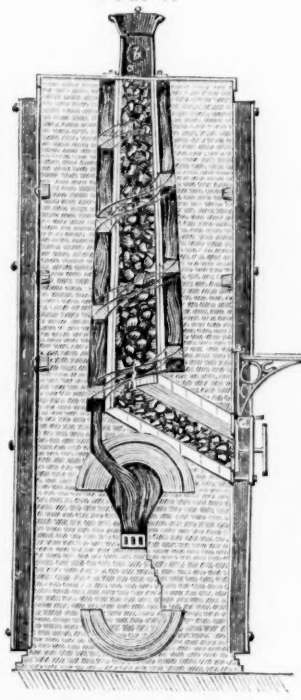


FIG. 2.

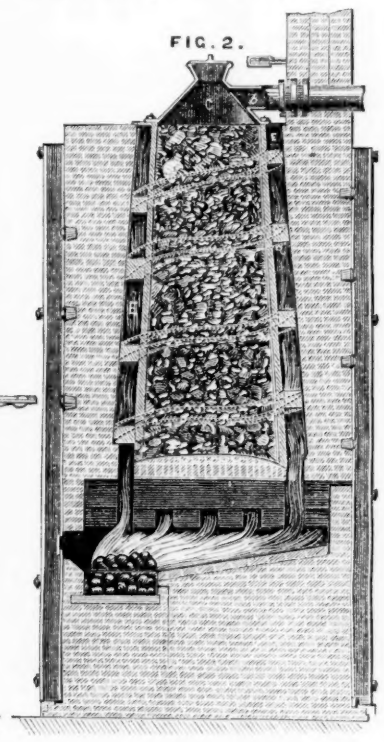


FIG. 3

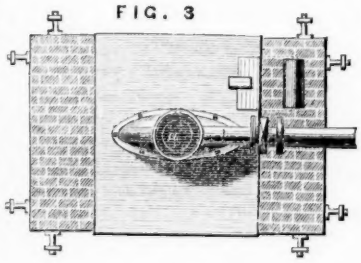
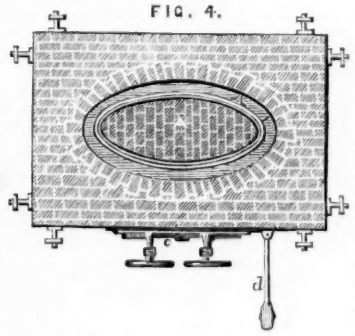


FIG. 4.



The operation of the apparatus, is as follows:—A quantity of coke is put into the retort (it having first been got up to the proper heat) sufficient to fill the bottom up to a level with the commencement of the vertical sides. Upon this bed of coke, a charge of coal is discharged from a wagon running on rails, fixed over or on a level with the top of the furnace or oven, or by any other quick and easy method, the drop valve *a*, being first raised from its seat. When the retort is charged, the valve is lowered into its seat and the heat of the furnace being kept up, the gas will be quickly caused to distill off, and escape by means of the exit pipe, *b*, to the hydraulic main (which may be fixed in any convenient position), and from thence to the condensers. When the coal is sufficiently carbonized, the door, *c*, is withdrawn from the retort, and swung aside by means of the small crane. The coke is then allowed to run out of the retort by its own gravity, either on to the ground or into wagons placed ready to receive it; a quantity sufficient to fill the sloping part or bottom of the retort being retained by replacing the lid, which is then screwed in place and luted as before. The retort is then ready to receive another charge of coal. Should it be thought desirable before this part of the process is performed, steam from a steam-boiler may be admitted into the retort, near the bottom. While passing through the red-hot coke it will be decomposed, and form gases valuable for mixing with the gas previously distilled from the coal. This decomposition of steam in the retort, will have a two-fold effect—first, it will afford an additional quantity of gas at a cheap rate; and secondly, when using coals which swell on being carbonized, the steam, by decomposing or destroying part of the coke, will facilitate its subsequent discharge from the retort. In addition to using steam, any of the hydrocarbon oils, tar, or such like substances may be economically converted into gas, by injecting them into the bottom part of the retort, by any well-known means. This part of the process may be carried on as long as may be considered desirable; but as the principal object in view is to make gas from coal, it must only be continued so long as experience may prove it to be profitable to do so: the design of this supplementary distillatory process being to utilize the heat of the red-hot coke, before discharging it from the retort, and which heat has been obtained in the first instance, in converting the coal into gas by means of the fuel used in the furnace.

It is not stated whether this apparatus is used by any gas company.

CEMENT FOR IRON PIPES.—A cement in which plumbago is a constituent has recently come into use for steam-boilers, gas and steam pipes, &c. It is said that it gives a joint superior to red-lead putty. It is composed of six parts of plumbago, three of slacked lime, eight of sulphate of baryta, and three parts of boiled linseed oil.

CORRESPONDENCE.

PETROLEUM AND WATER-GAS.

White Plains, N. Y., June 24, 1862.

To the Editor of the American Gas-Light Journal:

In your issue of June 16, page 377, I notice a card of J. E. Thomson, in one place stated to be a citizen of the United States, residing in Buffalo, N. Y., and in another, a citizen of Toronto, Canada, in which he asks me to disclaim what I had written in my letter to you of May 22d. Not yet seeing any reason for so doing, I must respectfully decline to comply with his request. Any mere personalities, however, which my letter contained, I am willing to withdraw; but having naturally felt indignant at seeing what I consider my own ideas, in which I am protected by patents, appropriated by another, I considered the provocation sufficient to call forth the expressions used. The claim which Mr. Thomson makes in his water gas patent, covers a process which I have used for over two years, and for which I have more than one patent. I have sent to Washington for a copy of Mr. Thomson's specification, and in your next number I may have something further to say on the subject. In the meantime, as the Canadian claim of this gentleman differs materially from his Washington claim, perhaps he may have an explanation to offer for the difference. The fact one's being a resident of Buffalo and Toronto at the same time, is suggestive of a ubiquity of presence not possessed by most individuals, but which may be particularly advantageous in obtaining the privileges of citizenship in both countries, and thus procuring patents for a much smaller sum than foreigners would have to pay.

Yours respectfully,
W. H. Gwynne, Civil Engineer.

MEMPHIS, TENN., GAS-LIGHT COMPANY.

Superintendent's Office M. G. L. Co.,
Memphis, Tenn., June 18th, 1862.

To the Editor of the American Gas-Light Journal:

If you can wait until our exchange becomes settled at a reasonable rate, for the amount of a subscription to your valuable Gas-Light Journal, you may send it immediately. I also wish to purchase several books, but will not order till our currency can be exchanged with less loss.

During the last year we have been completely cut off from all our sources of information as to what is transpiring in the gas-light world, and I would esteem it a favor if you would hand my address to some of the principal dealers in gas apparatus in your city, with a request to communicate, and send me circulars of whatever is new.

Our consumption here has greatly decreased since the unfortunate and unnecessary commencement of hostilities between the two sections of our country, but I hope we will soon be obliged to resume the extension of our works, and that matters will soon be smoothly flowing along in their accustomed channel. Please send me anything new in the way of notices of new scientific works, that you may have convenient.

Mr. A. Simister, the former superintendent of these works, who I presume has corresponded with you, died on the 30th of March last. I succeeded him immediately. Hoping to hear from you at your earliest convenience, I remain, yours very truly,

Chas. M. Hara,
Sup't Memphis G. L. Co.

[We comply cheerfully with Mr. Hara's request by sending him the Journal, and are quite content to wait for payment until the currency gets righted. Ed.]

Captain Oswald Pardoned.—William L. Oswald, of West Troy, N. Y., who was a captain in the Thirty-Fourth New York Volunteers, and had been convicted of inciting mutiny in the face of the enemy, was some time since sentenced to be degraded from his captaincy, have his sword broken, and to be confined in the District of Columbia prison for one year, was unconditionally pardoned by the President of the United States, on the 21st inst. The Attorney General decided that there was no foundation in fact for the severe punishment which was meted out to him. Captain Oswald was, and we believe is still, secretary of the West Troy, N. Y., Gas-Light Co. We do not believe a word of his exciting a mutiny, but we wish he would come back to his work, and double his dividends.

A SUGGESTED IMPROVEMENT IN PHOTOMETRICAL APPARATUS.

BY WILLIAM E. A. AIKIN, M. D., PROF. CHEMISTRY, UNIVERSITY OF MARYLAND.

The difficulty at times in determining with exactness the equal action of transmitted and reflected light on the opposite sides of the Bunsen photometer screen, when in use, has probably occurred to others as it has to myself. If the relation between the translucent and opaque portions of the screen could be so adjusted that when acted on by opposite lights of equal intensity all differences should vanish and both surfaces appear uniformly and equally illuminated, its value for photometrical purposes would be beyond cavil. But if the opposite surfaces, when in use, are not equally and uniformly illuminated, if there is any perceptible difference between the marginal and central portions, then the eye of the observer is required to decide when this difference in the one side is exactly equal to the difference in the other. And this comparison must be made between two objects that cannot be brought side by side, and which, of course, cannot be examined simultaneously. After experimenting with various applications to obtain the required translucency for the screen, nothing has given as satisfactory results as the suggestions of Dr. Leeson. His disc, formed by cutting a figure out of fine white paper and inclosing this within a sheet of thinner paper of the same color, comes nearest the required conditions, and gives, in practice, its opposite sides very nearly uniformly illuminated. Yet even this, with any paper I can procure, cannot be made to appear perfectly uniform on both sides at the same time; and although the error involved may be considered unimportant for commercial purposes when noted by an experienced observer, its magnitude must be uncertain and varying in the hands of the inexperienced or careless, and should be got rid of if possible. In view of this, it occurred to me some time since, that a slight modification of the Rumford photometer might be made to give more exact and uniform results, and after a somewhat extended and comparative trial my first impressions have been fully confirmed. The modification consists simply in using two parallel vertical rods to supply the shadows for comparison, with an adjustment permitting these shadows to be shown distinct and separate, or blended, or overlapping. The four shadows thus alternate with each other and give always a gas shadow between two candle shadows, and a candle shadow between two gas shadows. Slightly separated, they alternate with white stripes; slightly overlapping, they alternate with deep black stripes, or merely blended, the four will appear as one continuous shadow, more or less perfectly uniform. And, as we cannot have stripes of unequal tints of the same color in juxtaposition without affecting the intensity of the tints, this action of the law of contrast of tone, by heightening slight differences and thus magnifying errors, must aid materially in determining an exact equality; and as the objects to be compared are side by side, and the eye, from its position, undisturbed by any extraneous light, the sources of error are thus farther diminished. The following arrangement I have found convenient: An hundred inch photometer bar with the usual standard gas-burner at one end has at the other end a small wooden screw some six inches square, covered smoothly with drawing paper to receive the shadows. In front of the screen, at the distance of two inches or more as may be convenient, are two vertical parallel blackened iron rods, a quarter of an inch in diameter and about three-quarters of an inch apart, to supply the shadows for comparison. The rods are riveted to a small iron disc which is attached to a wooden support by a single screw at one end, the disc moving around the screw. By this means the rods can be adjusted to throw their shadows at the maximum distance apart, or at any intermediate distance until we reach the other extreme, when the shadows will coalesce and appear as one. The wooden support to which the disc is screwed moves on a bar back and forth at right angles to the line of light from the gas flame to the screen, and the whole rests on a slide like that which carries the ordinary Bunsen screen, and like that moves on the photometer bar. This arrangement permits one to place the rods nearer or further from the screen, to cause the shadows to fall on its central or marginal part, and also to vary the relative portion of the shadows by separating, blending, or overlapping them. The rod that carries the candle holder also rests on a slide similar to the above and has a lateral motion at right angles to the above line of light to carry the candle out of that line to any required extent, never, however, exceeding a few inches. The slide of the candle holder is provided with an index to note the candle power on the gradual scale, and candle and burner and screen can all be raised or lowered at will, and the plane of the screen can be adjusted at right angles or any required angle to the photometer bar. These several adjustments are necessary, but it does not follow that the above described means for obtaining them are the best possible—they are convenient. The theoretical objections to this arrangement, the motion of the candle, the interference of color in the shadows to be contrasted, and a possible inaccurate measurement of distance, will be found with ordinary skill more formidable in theory than in practice. When examining gas like that in common use in our cities, subject to no greater or more sudden variations in illuminating power, the actual motion of the candle is too trifling to interfere with the accuracy of the observations. And even in extreme cases where more extended motion becomes necessary, a little more time and attention appears sufficient to give the same accuracy. Again, any difference in the color of the shadows, within the ordinary limits of candle powers for ordinary gas, sometimes absolutely inappreciable, is never likely to create any serious difficulty—at least, none that will compare with the difficulty of deciding differences in the illumination of two surfaces which cannot be brought side by side, and which, moreover, are illuminated by lights of different color. In regard to measurement when the screen is exactly at right angles to the line of light from the gas-burner, the index distance of the candle must be a trifle less than the actual distance, and consequently the candle power noted will be a trifle greater than the actual power, since the hypothenuse of a right angled triangle must exceed in length the longest of the two containing sides. The most simple remedy is to alter slightly the inclination of the plane of the screen to the photometer bar so that the shadow shall fall equi-distant from and on opposite sides of a perpendicular to that plane. A perfect mechanical remedy is to attach the candle holder to a radius moving in the centre that coincides with the vertical axis of the screen holder, when the motion of the candle from or towards the photometer bar will be the arc of a circle instead of a tangent. One incidental advantage of this arrangement arises from the virtual lengthening of the scale, giving greater length to the degrees that mark the candle powers and consequently facilitating observations. The gas flame being constant at 100 inches from the screen, the candles distant say 25 inches, indicating 16 candle gas, must be moved over a greater space to represent 15 or 17 candle gas than the corresponding spaces on the Bunsen scale. And the conclusion I am disposed to draw from my trials with this compared with other modes of inquiry is, that while it is open to no more serious objection than others, it presents some decided advantages.

ON THE IGNITING POINT OF COAL-GAS.

BY DR. E. FRANKLAND, F.R.S.

The temperature at which coal-gas will ignite under ordinary, or extraordinary conditions, is a circumstance of considerable importance, both to manufacturers and consumers of gas; nevertheless, the recent explosion in Holborn, and the difference of opinion which evidently prevails, even amongst those who are intimately acquainted with the properties of coal-gas, prove that the subject has not hitherto received that attention which it obviously merits. Under these circumstances, the following experiments, and the conclusions drawn from them, although they are far from exhausting the subject, may not perhaps be altogether unacceptable as a contribution to this part of the history of coal-gas. The heterogeneous mixture of gases and vapors, known as coal-gas, may for our present purpose be assumed to consist of:—

Olefiant gas and other luminiferous hydrocarbons.

Light carburetted hydrogen, or fire-damp.
Hydrogen.
Carbonic oxide.
Bisulphide of carbon.

Now, as these constituents can, to some extent, become separated from each other, under certain circumstances, it is desirable, at the outset of the inquiry, to examine separately their respective igniting points.

1. Olefiant gas, which may be taken also as the type of the remaining luminiferous hydrocarbons, could not be inflamed by a hot iron, unless the latter were heated until it appeared of a cherry-red color in the daylight of a tolerably well-lighted room.

2. The igniting point of light carburetted hydrogen was carefully determined by Davy, to whose observations I have not a word to add. He says that, "light carburetted hydrogen can be inflamed by *white hot sparkling iron*, but not by iron at a red heat; it is, therefore, much less inflammable than hydrogen or carbonic oxide, and less so than olefiant gas." Bischof says that it cannot be inflamed by burning tinder, even though the tinder be strongly blown upon.

3. Hydrogen inflamed at a lower temperature than olefiant gas, but it could not be ignited by a rod of iron, unless the latter were heated to a temperature considerably beyond visible redness in a tolerably well-lighted room.

4. Carbonic oxide inflamed at a temperature somewhat greater than that at which hydrogen ignited, but lower than that necessary for the inflammation of olefiant gas.

5. Bisulphide of carbon vapor ignited at 300° Fahr.

In some experiments recently made in connection with the gas explosion in Wood street, I had occasion to observe that when coal-gas is allowed to mix with air contained in a space, partly enclosed, but still communicating freely with the atmosphere, such as the open gas-main in Holborn, for instance, there occurred an approximate separation of the lighter from the heavier constituents of the gas; thus samples of the explosive mixture taken from such a space were found on analysis to contain olefiant gas, luminiferous hydrocarbons, carbonic oxide, and bisulphide of carbon, with but a small per centage of light carburetted hydrogen, and mere traces of hydrogen, although the two latter gases constitute, as is well known, the chief bulk of coal-gas. These gases must, therefore, have rapidly made their way out of the partially-enclosed space into the atmosphere. This behavior of the different constituents of coal-gas, when the latter is slowly admitted into one end of an open main containing atmospheric air, may not inaptly be compared to that of a number of birds, of different powers of flight, entering at one end of the pipe, and making the best of their way towards the opposite extremity. At every moment from the entrance of the birds, the percentage of those of swift flight would diminish near the entrance-end of the pipe, whilst that of the birds of slower velocity would obviously increase in the same ratio.

The Master of the Mint has proved that the rapidity with which gases diffuse into each other, or into a vacuum, is inversely proportional to the square roots of their specific gravities; and, although there are some circumstances in the case of the open gas-main, or partially-enclosed space, which would somewhat interfere with this ratio, yet, for all practical purposes, Mr. Graham's law may be assumed to express correctly the different velocities with which the constituents of coal-gas would hasten to escape from the space in question. These velocities of diffusion are as follows:

Bisulphide of carbon	1
Olefiant gas	1.66
Carbonic oxide	1.66
Light carburetted hydrogen	2.19
Hydrogen	6.23

All other luminiferous hydrocarbons existing in coal-gas must have a diffusion velocity lower than that of olefiant gas.

Thus the effect of diffusion of coal-gas in an open horizontal pipe, or other similar partially-enclosed space, would be to form an explosive mixture, containing chiefly hydrogen as the combustible gas, at or near the open extremity of the pipe; whilst the explosive mixture, formed near the end of the pipe where the gas entered, would contain chiefly carbonic oxide, olefiant gas, and bisulphide of carbon.

It is obvious, from experiment No. 3, that the explosive mixture, formed near the mouth of the tube, would ignite at a somewhat lower temperature than that required for the ignition of an explosive mixture containing all the constituents of coal-gas. Still, even this more inflammable mixture could not be ignited below a red heat distinctly visible in the daylight of a room. It might, however, be expected that the explosive mixture, formed at the opposite extremity of the tube, would be capable of ignition at a still lower temperature, owing to the continued increase in the proportion of the highly inflammable but sluggish bisulphide of carbon, which could, doubtless, under favorable circumstances, increase to at least ten times the amount originally contained in the coal-gas. In order to ascertain the effect of the presence of a considerable percentage of bisulphide of carbon vapor upon the inflammability of the constituents of coal-gas, and expecially of carbonic oxide and olefiant gas, the following experiments were made:

6. Carbonic oxide was mixed with about 3 per cent. of the vapor of bisulphide of carbon, and was then allowed to issue from a jet into the air. The jet of gas readily ignited on the approach of a glass tube containing oil heated to 410° Fahr., the ignition point of the gas being probably not higher than 350° Fahr.

7. Hydrogen, containing the same amount of bisulphide of carbon vapor, ignited by contact with a tube containing oil at 420° Fahr.

Here, then, was a phenomenon which would seem to indicate the alarming possibility of the ignition, at a comparatively very moderate heat, of explosive mixtures of coal-gas and air; fortunately, the next experiments entirely allay any apprehensions on this score.

8. Olefiant gas, impregnated with 3 per cent. of the vapor of bisulphide of carbon, did not inflame at a perceptibly lower temperature than when free from the admixture of the sulphur compound.

9. To the highly-inflammable mixture of carbonic oxide and vapor of bisulphide of carbon, used in experiment No. 6, a minute trace (not 0.1 per cent.) of olefiant gas was added; instantly, the igniting point of the mixture was raised to that of pure carbonic oxide.

10. A similar experiment with the hydrogen mixture (No. 7), gave a corresponding result.

Thus, the extraordinary inflammability which is imparted to carbonic oxide and hydrogen by the vapor of bisulphide of carbon, is entirely removed by mere traces of olefiant gas; and it is probable that the other luminiferous hydrocarbons contained in coal-gas would produce the same effect. In order to complete this part of the inquiry, it now only remained to extend these experiments to coal-gas itself.

11. Coal-gas could not, even under the most favorable circumstances, be ignited at a temperature perceptibly below that described in experiment No. 4, as necessary for the inflammation of carbonic oxide.

12. When coal-gas was mixed with 3 per cent. of bisulphide of carbon vapor, its igniting point was not lowered in the slightest degree.

Having thus proved that any amount of diffusion can have but a very slight effect upon the inflammability of explosive mixtures of coal-gas and air, the following experiments were made, to decide the disputed point, whether coal-gas can be inflamed by sparks:

13. Hydrogen was readily inflamed by sparks struck from flint and steel.

14. Carbonic oxide was also readily ignited in a similar way.

15. The mixture of coal-gas and air, issuing from a wire-gauze burner, was repeatedly, and easily, inflamed by the sparks struck from flint and steel.

These results are quite in conformity with the experience of gas-engineers and managers, several letters from whom are now before me, describing the ignition of gas from the sparks elicited by the contact of a workman's pickaxe with stones, the chipping of a main, &c. The notion that coal-gas will not inflame under these circumstances has, doubtless, arisen from the impossibility of so igniting the gas of coal-mines; but the combustible gas existing in British coal-mines has been proved, by very numerous analyses, to be light carburetted hydrogen only—no trace of hydrogen, carbonic oxide, or olefiant gas being present in it. Now, the igniting point of light carburetted hydrogen, as has already been explained, is very much higher than that of the other combustible gases present in coal gas, and hence, whilst the mine may be safely lighted by the "steel mill," the use of such an instrument in an explosive mixture of coal-gas, would infallibly cause ignition. A word of warning as the use of the safety-lamp in gas-works may perhaps not be here out of place. Even in the difficultly inflammable fire-damp mixture of coal-mines, the Davy lamp was known, by its inventor, to be unsafe in certain conditions,—as when placed in a strong draught or rapidly swung to and fro. Any degree of insecurity thus attaching to the safety-lamp in mines is increased tenfold when it is used in explusive mixtures of coal-gas, and hence it is highly desirable thai the gauze of such lamps should be finer than that used in the miner's lamp, and also that the workmen should be stringently prohibited from placing the lamps in a draught of explosive gas, or swinging them to and fro, since the neglect of these precautions may easily cause disastrous explosions.

In conclusion, the results arrived at may be thus shortly summed up:

1. Coal-gas cannot, even under the most favorable circumstances, be inflamed at a temperature below that necessary to render iron very perceptibly red hot by daylight in a well-lighted room. But this temperature is considerably below a red heat visible in the open air on a dull day.

2. This high igniting point of coal-gas, under all circumstances, is due in a great measure to the presence of olefiant gas and luminiferous hydrocarbons.

3. The igniting point of explosive mixtures of the gas of coal-mines is far higher than that of similar mixtures of coal-gas; consequently, degrees of heat, which are perfectly safe in coal-mines, may ignite coal-gas; hence, also, the safety-lamp is much less safe in coal-gas than in fire-damp.

4. Explosive mixtures of coal-gas and air may be inflamed by sparks struck from metal or stone. Thus an explosion may arise from the blow of the tool of a workman against iron or stone, from the tramp of a horse upon pavement, &c.

5. Explosive mixtures of coal-gas may also be ignited by a body of a comparatively low temperature, through the medium of a second body, whose igniting point is lower than that of coal-gas. Thus sulphur, or substances containing sulphur, may be inflamed far below visible redness; and the contact of iron below a red heat with very inflammable substances, such as cotton waste, may give rise to flame, which will then, of course, ignite the gaseous mixture.—*Journal of Gas-Lighting.*

Liabilities of Gas Companies.—The Supreme Court of the State of Wisconsin, recently decided a case involving the liabilities of gas companies. In 1857, Sidney Shepherd applied to the Milwaukee, Wis., Gas Company for gas to light his store in that city. He was informed that he could have it if he would sign the application book indorsing the printed rules of the company. He refused, and the gas was denied him. He sued the company and gained a verdict of $100 damages. The case was carried to the Supreme Court, where it was decided that the company had the exclusive right to make and sell the gas; was bound to supply it on reasonable terms; that applicants might be required to sign an agreement that is reasonable; and that the following rules of the company were not reasonable:

"That the company shall at all times, by their agents, have access to the premises to examine the gas apparatus, or remove the meter or service pipe. That the company reserves the right to cut off the service pipe to protect the works against fraud. That the fittings, after the admission of the gas, must not be disconnected or opened, either for repairs or extensions, without a permit from the company."

Immediately after the commencement of the suit, Mr. Shepherd made another demand, and tender of money for gas, and was again denied. His store was without gas 19 months. He brought another suit against the gas company—the previous judgment having been paid. At the County Court the plaintiff was non-suited. He carried his case to the Supreme Court, where the non-suit was reversed, and the jury found a verdict in favor of the plaintiff, for $1,500. The company appealed to the Supreme Court, and that Court

affirmed its last judgment, amounting with costs, to $1,800, and there the matter rests.

It is amazing that gas companies will continue thus to array themselves against the citizens. In all cases where the issue goes to the jury, their sympathy naturally inclines to the citizen, while in the case above reported, the question was purely one of law, and being settled by the highest judicial authority of the State, deprives the company of one of its most cherished rights—the exclusive supervision of its own fixtures upon the premises of consumers. We regard the decision as a severe blow to gas companies throughout the country, and the stupidity and obstinacy of the Milwaukee gas directors, are alone to be thanked for it.

PATENTS.

UNITED STATES.

35,233.—Benjamin Harnish (Miller), of Pequea, Pa., for Improvement in Water Wheels:

I claim the composite casing, F G H, with its open cylinder, E, in combination with and closely adapted to the buckets, N, with their outer flange or square terminus, M, and parabolic, spiral chutes, O, and the position and attachment of the check plates, P, between them, all combined and arranged substantially in the manner and for the purpose specified.

35,239.—T. T. Jacobs, of Mount Carroll, Ill., for Improved mode of Securing Chimneys to Lamps:

I claim the combination of the two clasps, A A, each having two projecting lips or catches, c c, with the spring, D, constructed, operated and applied, substantially as and for the purpose specified.

35,243.—Henry Knight, of Jersey City, N. J., for Improvement in Moulds for Cement Pipes:

I claim the combination of the divided core, D D', slots, i i, guide pins, h h, and perforated platform, B, substantially in the manner described.

Second, The construction of the base plate, E E', in such a manner that it constitutes when in use the collar of the core bar and also the bottom of the mould, and serves as a support to the outer or lower end of the pipe, and also the shoulder of the socket when the mould and pipe are being lifted over the core, substantially as described.

Third, The construction of a vertical mould, divided longtitudinally in two parts, in combination with the base plate, so arranged that it shall support and hold the two parts of the mould firmly closed, while the said mould and the inclosed pipe are being raised over the core bar, substantially as described.

35,258.—A. M. Putnam, of Antrim, N. H., for Improvement in Pumps:

I claim the described pump, consisting of the piston, E, cylinders, A and G, chambers, H I J K, with ports, g and h, in combination with the base, C, containing water ways, i n q, with open ports, r o, and valves, l m s p, arranged and operating substantially as described.

35,264.—William Seybold, of McKeesport, Pa., for Improvement in Miners' Lamps:

I claim constructing lamps for burning tallow or other non-fluid fatty substances, with a wick tube of copper or other sufficient conductor of heat, surrounded by a hot-air chamber, for the purpose of melting the tallow or fat around the wick in the lamp, and keeping the tallow melted in the wick itself, substantially in the manner and for the purposes set forth.

35,269.—George Tainter, of Watertown, Mass., for Improvement in Ventilating Dampers:

I claim the combination of the conical damper, C, and band or ventilating register, B, connected together and applied to the flue or pipe for joint operation, substantially as for the purpose specified.

35,295.—J. S. Brown, of Washington, D. C., assignor to himself and Joseph Kent, of New Albany, Ind., for Improvement in Water Elevators:

I claim, first, The conical portion, b, of the windlass, or its equivalent, for conveying the raised bucket over the discharging spout, arranged and operating substantially as specified.

Second, I also claim the lever, I, and double branch chain or cord, m, acting in combination, substantially as specified for lifting the valve.

Third, I also claim overbalancing the empty bucket, G, when suspended at or near the apex of the conical portion of the windlass by the crank or winch, C, substantially as and for the purpose set forth.

Fourth, I also claim the dripping spout, E arranged and operating in combination with the discharging spout, D, substantially as and for the purpose specified.

35,319.—W. A. Lighthall, of New York City, for Improvement in Condensers for Making Potable Water:

I claim the combination of the discharge pipe A, with the series of cooling tubes, D, arranged and operated as and for the purpose set forth.

35,336.—J. E. Thomson, of Buffalo, N. Y., for Improvement in the Manufacture of Illuminating Gas:

I claim the manufacture and use of illuminating gas produced by a combination of petroleum or rock oil, or other hydrocarbon gases, petroleum being used by preference, with combination gases produced by the action of water in a spheroidal state on hydrocarbon vapors, substantially as described.

35,341.—Gustav Wedekind, of Philadelphia, Pa., for Improved Shade Holder for Gas Burners or Lamps:

I claim the combinarion of the clasp, open ring, or buckle, d, with a shade holder, substantially as and for the purpose set forth.

I also claim, in combination with the shade holder, the supports, i, in the braces for holding a chimney or protector, substantially as described.

35,349.—C. F. Martine, of Dorchester, Mass., assignor to himself and R. H. Emerson, of Lynnfield Center, Mass., for Improvement in Lamps:

I claim the tube, C, open at both its top and bottom, its lower end being at or near the top of the wick tube, and its upper end projecting above the wick, the whole constructed, arranged, and operating substantially in the manner and for the purpose specified.

35,359.—Andrew Black, of New York City, for Improved Machine for Making Mould Candles:

I claim, first, The combination of a horizontally rotating mould table and a series of wick spools, E E, arranged in a stationary rack or stand, D, substantially as specified.

Second, The combination with the horizontally rotating mould table and the series of wick spools, E E, of a perforated wick board, H, and a system of wick clamps, G G, substantially as specified.

Third, The employment for molding candles of divided moulds, constructed to operate substantially as described.

Fourth, The arrangement of the moulds to slide, substantially as described, on horizontal racks, C C, curved by a horizontally rotating table.

35,363.—C. T. Close, of New York city, for Improvement in the Manufacture of Lamps:

I claim the combination of the globe or vessel, 1, and base 2 2 2, constructed and arranged substantially as set forth.

35,366.—Perry Dickson, of Utica, Minn., for Improved Water Wheels:

I claim a water-wheel fitted loosely on its shaft, A, and connected therewith by springs and provided with adjustable buckets, c, connected with the shaft by lever, B', and collar, C, or equivalent mechanism, all arranged to operate as and for the purpose set forth.

35,369.—A. H. French, of Pittsfield, Ill., for Improvement in Water Elevators:

I claim the flat or square-linked chain, E, the grooved pulley C, carrying stop-pins, b b, buckets, D D', with hinged valves in their bottoms, and hooks, h h, on their sides, and the hinged troughs, G G', with their pivoted bails, g g', all arranged and combined as and for the purpose set forth.

35,370.—William Fulton, of Cranberry, N. J., for Improvement in Coal-oil Burners:

I claim, first, The combination of gauze wire, m, as shown in Fig. 7, with holes, K, as shown in Fig. 1 and Fig. 5, or their equivalents.

Second, I claim the combination of holes, K, as shown in Fig. 1 and Fig. 5, with the gauze-wire or perforated plate, L, as shown in Fig. 3 or their equivalents.

Third, I claim the combination of the impinger, D, with holes, K, shown in Fig. 1 and Fig. 5, and the gauze-wire or perforated plate, L, as shown in Fig. 3, the whole being arranged substantially as and for the purpose set forth.

35,372.—Ralph Grow, of Galesburg, Ill., for Improved Benzole Soap:

I claim the employment of benzole when used in the manufacture of soap, substantially as specified.

35,382.—R. M. Merrill, of Chicago, Ill., for Improved Lantern Lamp:

I claim the application of one or more air-passages through a lantern lamp and its bottom, substantially as described and for the purpose specified.

Also the application of one or more air passages through a lantern lamp and its bottom, substantially as described and for the purpose specified, in combination with an air-current checker, for the purpose set forth.

35,383.—O. F. Morrill, of Chelsea, Mass,, for Improvement in Apparatus for Vaporizing and Burning Liquid Hydrocarbons:

I claim an aero-vapor burner as constructed, with the fluid vaporizihg conduit arranged to extend across or over the same and through the chimney, and from thence to pass down alongside of and enter the air and vapor-mixing chamber, substantially as described.

I also claim the combination of the reservoir and its conduit, provided with a regulating or stopcock, as described, with the aero-vapor burning in such manner that the fluid to be vaporized shall be caused by the action of gravity to pass through the stopcock and the vaporizing tube and across or over the foraminous cap of the burner, in order that the fluid may be heated or vaporized by the flame of the mixed air and vapor applied directly to the conduit as set forth.

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PATENT-OFFICE NOTICES.

United States Patent-Office,
Washington, April 17, 1862.

ON THE PETITION OF PHEBE Ann Fisk, Executrix, &c., of Almond D. Fisk, late of the City, County, and State of New York, praying for the extension of a Patent granted to the late Almond D. Fisk, Nov. 14, 1848, and re-issued March 6, 1860, for an improvement in Coffins, for seven years from the expiration of said Patent, which takes place on the 14th day of November, 1862.

It is ordered that the said petition be heard at the Patent-Office on Monday, the 27th of October next, at 12 o'clock m.; and all persons are notified to appear and show cause, if any they have, why said petition ought not to be granted.

Persons opposing the extension are required to file in the Patent-Office their objections specially set forth in writing at least twenty days before the day of hearing; all testimony filed by either party to be used at the said hearing must be taken and transmitted in accordance with the rules of the office, which will be furnished on application.

The testimony in the case will be closed on the 13th of October next; depositons and other papers relied upon as testimony, must be filed in the office on or before the morning of that day; the arguments, if any, within ten days thereafter.

Ordered, also, that this notice be published in the "National Republican," Washington, D. C., and "Tribune," New York, N. Y., once a week for three successive weeks; the first of said publications to be at least sixty days previous to the day of hearing.

D. P. HOLLOWAY,
Commissioner of Patents.

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References—Prof. Jas. C. Booth, U S. Mint, Phila.
Christopher Fallon, "
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See also certificates from Cincinnati, O., and Louisville, Ky. Gas-Works in same number, page
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POTTS' REVOLVING SIGNAL LIGHTS,

PATENTED SEPTEMBER 8, 1857.

Mr. ALBERT POTTS, the well known Inventor of the LAMP POST LETTER BOXES, which have been adopted by the Post Office Department for the large cities of the United States—and also of the GAS METER BOX, to be set in the front walls of houses, thus doing away with visits from Gas Inspectors, or burglars in gas-clothing, has lately brought forward a third Invention, which in point of importance and world-wide usefulness, surpasses the others entirely.

These SIGNAL LIGHTS are intended for use on Vessels propelled by Steam, and those exclusively. They specially indicate the presence of a Steamer, and by their use, there will be less likelihood of mistakes, and consequent collision than at present. They are also intended for SIGNALLING AT NIGHT, and can be used for that purpose UNDER ANY CODE of SIGNALS NOW ARRANGED FOR FLAGS.

This Improvement in Lights for Steam Vessels, consists in having the Lanterns containing the colored lights, connected by means of a series of cogged gearing with some convenient part of the Engine or Machinery, so as to cause them to have a revolving motion around their axis. On side wheel steamers, the Lanterns should be placed directly over the wheel-houses, and the power, or motion to turn them, may then be very conveniently obtained from the paddle wheel shaft. On Propellers, the Lanterns should be placed on each side of the Pilot House, or hurricane deck, and the rotary motion derived from any convenient or suitable part of the Engine or Propeller Shaft. Each Lantern is supported on the end of movable cranes, so that their relative positions may be changed and properly adjusted to suit the view of observers on either side of the vessel at the time of signalling.

The Lanterns to be used in this improvement may be constructed for Burning Oils, Fluids, Gas, or any of the known modes of illumination, and should be furnished with one or more lenses and reflectors, so as to concentrate the rays of light, and project them over the horizon with the greatest intensity. The lenses for this purpose should be made with colored glass, viz., Red and Green, and the position of the respective Lanterns, according to the color of the lenses therein, must be placed on the sides of the vessel so as to answer to the requirements of Rules and Regulations made and published by the Supervising Inspectors of Steamboats, agreeably to the Act of Congress of the United States in such cases made and provided. That is to say—by said Regulation—the Lantern having the green lenses for producing the Green Colored Light, must be placed on the starboard side of the vessel, and the other Lantern producing the Red Light, to be placed on the port side thereof in pursuance, also, of the aforesaid Rules and Regulations, there is to be found in board and behind each Lantern, a screen to answer the purposes therein mentioned.

The cogged gearing, by which the Lanterns are connected with the Engine or paddle wheel shaft, and thereby caused to revolve when the Engine is in motion, is so arranged that the connection may be readily shipped or unshipped, and the lanterns made stationary or otherwise, at the pleasure of the Pilot, or those whose duty it may be to operate and attend to the same. The cranes on which the Lanterns are placed, are also rigged so as to be readily turned horizontally from one position to another, so as to present one or both lights to the view of observers when laying athwart ships at the time of signalling

On the Use and Application of the Improvement for Night Signals.

When the vessel is under weigh, or going ahead in its course, the Lanterns are to be placed directly athwart ships, so that such colored light therein will then have the position and place prescribed by Rule Seventh of the afore-said Supervising Inspectors of Steam Boats, and with the screens behind them, as above described, will then answer all the intents and purposes for which the colored lights are thus required to be used, as illustrated in the several diagrams published by said Inspectors for the working of a system of Colored Lights. The Lights in this case, according to the color seen by the observer, indicate the course or direction of the vessel whereon they are carried When the Lanterns with the colored lights therein, are made to revolve around on their axis, as proposed in this improvement, in addition to the signal above, another, and as we believe, very important and useful signal is thus formed, indicating that the vessel, whereon it is carried is a Steamer. In dark foggy nights, it is found by experience, to be somewhat of a difficult task to distinguish sailing vessels from Steamers and Propellers, especially when the latter are rigged, and carry a press of sail. When Steamers meet "head and head," it is the duty of each to pass to the right, or, on the larboard side of the other. Whereas, when a Steamer meets a sailing vessel, the former must give way and allow the latter to pursue its course. Hence, to carry out the regulations of the said Steamboat Inspectors, and prevent collisions, it is important to have some infallible sign, whereby the character of the vessel may be readily seen and determined. Several very fatal collisions have recently taken place through mistakes of this kind.

On Signals for Speed and Distance.

The gearing of the Lanterns with the paddle wheel or propeller shaft, may be so arranged as to be an index of their speed A very good proportion, would probably be to make the Laterns turn about one third as fast as said shaft. Hence, when the speed of the vessel is previously known, when making a certain number of revolutions of the paddle or propeller, it becomes an easy task from observing the time with which the Lanterns thereon may be turning to approximate to the speed with which the said vessel is moving at the time of observation. Again, as the arcs described by the rays of light from each lantern, as they revolve around on their axis, is greater in proportion to the distance from said lantern, so will the time in which said rays move over any given space, be less in the same proportion. Hence, when the lights are very remote, or far off, from the observer, the duration of each column or cylinder, of rays from each lense, would pass the eye of the observer, in a short space of time or with great velocity. Whereas, at a nearer point of observation, the time of its passage would be considerably lengthened, or the motion thereof apparently much slower. From these facts, we believe the improvement is susceptible of indicating, in an approximate manner, the speed and distance of vessels whereon the revolving lights may be used.

On the Application of the Improvement for Marine Telegraphic Purposes.

The Revolving Lights can be readily applied to the general purposes of Marine Signalling at night, as follows: In order to show this application, we have adopted the Numbers as given in Roger's Code of Marine Day Signals, believing that work to be somewhat of a standard in matters of this kind. Instead of the flags used in the above code, for day signals, to indicate the combinations of two or more letters of the Alphabet, which combination is referable to certain numbers indicative of the words or sentences telegraphed, we propose to perform the same operation, at night, by means of the two revolving colored lights, so as to indicate the numbers directly to which the intended words or sentences to be telegraphed are referable. Thus, whether the vessel to be signalled is ahead, astern, or abaft the beam, the position of the two colored lights must be so adjusted, by means of the moveable cranes, whereon said lanterns or lights are fixed, that the two lights may be fully made visible to the observer. When both lights are thrown into this position, stopping the motion of the lanterns may be the signal for calling attention, or a rocket fired off, or the steam whistle blown, would answer the same purpose. Now, in order to represent the ten numerals, we propose to indicate them by the respective motions of the two colored lights, as follows:

RED LIGHT.				GREEN LIGHT.			
One Red,	Represents	Number	1.	Two Green,	Represents	Number	2.
Three	do.	do.	3.	Four	do.	do.	4.
Five	do.	do.	5.	Six	do.	do.	6.
Seven	do.	do.	7.	Eight	do.	do.	8.
Nine	do.	do.	9.	One	do.	do.	0.

In the above arrangement, it will be seen that all the odd numbers are made by the Red Light, and the even numbers by the Green Light. In order to indicate the repeat of the last number, once or more times, or for other special purposes, which may hereafter be found useful and necessary, an even number of lights may be shown by the Red, and an odd number by the Green. It will be understood that when the Lanterns are made with three lenses in them, the numerals as above arranged are formed by the number of times a new light or lense is presented to the observer. Thus to indicate the number 3, the Red Light or Lantern would make one entire revolution; and to make the number 6, the Lantern carrying the Green Light would make two revolutions, and so on with the other numbers. When a symbol is made, the motion of the Lantern is to be suspended for a short time, and when a number expressing a sentence is formed, the lantern may be stopped for a longer period, or some one of the special signals above referred to, may be used for this purpose.

To show the application of this improvement as above mentioned, whereby these Lights can be used as readily for Night Signals, as Flags are used for Day Signals by the author of Roger's Code, we shall use the sign O colored red or green, according to the light used, to show the number of movements performed by the respective lights in order to represent any desired number of said code, suitable for the required purpose.

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O,	
O, O, O, O, O, O, O.	
	O, O.
	O. O.

The above would represent the number 5722, and by reference to said Roger's Code, would be found to stand before the sentence:
"WILL YOU SHOW THE NUMBER THAT REPRESENTS YOUR NAME?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O.	
O, O, O, O, O, O, O.	
	O, O.

Here the number expressed is 1572, and per the same Code, stands for
"WHERE ARE YOU BOUND?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O, C, O, O, O.	
	O, O.
	O, O, O, O, O, O, O, O, O.

The number thus expressed is 1928, and per said Code is
"WHAT IS YOUR CARGO?"

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O.	
	O, O, O, O, O, O.
	O.
O, O, O.	

Here the number expressed is 5603, and stands for
"HAVE YOU ANY NEWS?"

(RED LIGHT.)

Fig. 2

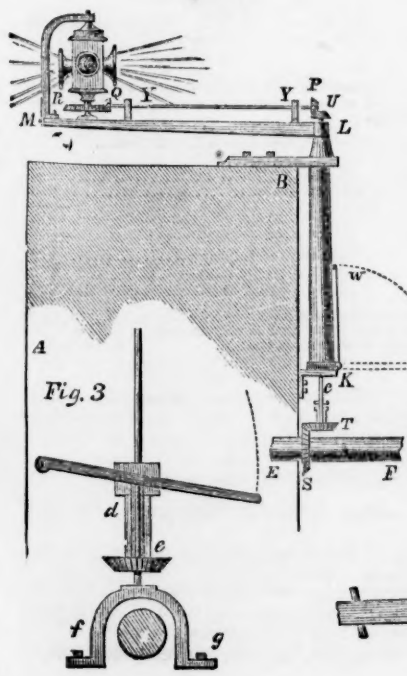


Fig. 3

(GREEN LIGHT)

Fig. 1

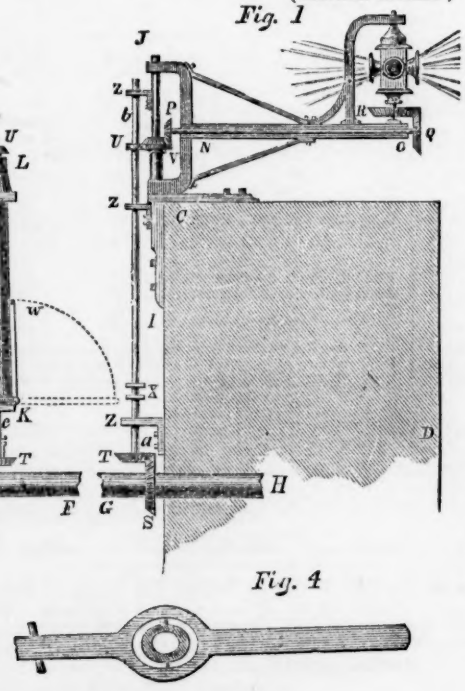


Fig. 4

MECHANICAL CONSTRUCTION.

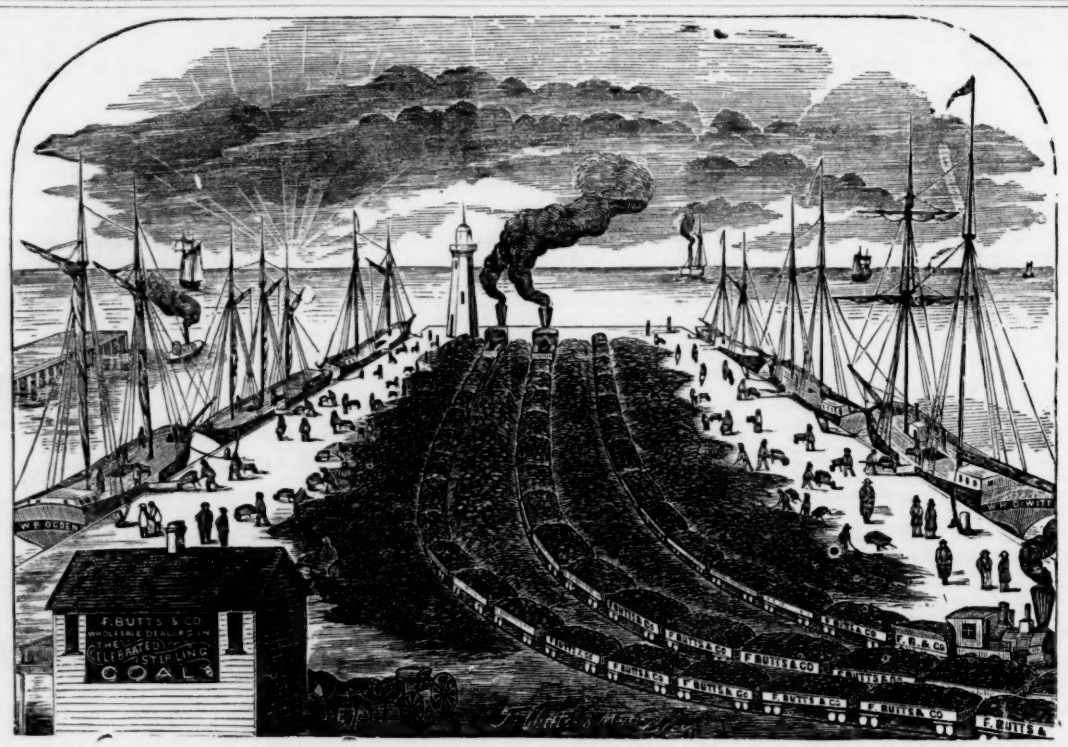
In our engravings, Figs. 1 and 2, represent Vertical Sections through the wheel-house. In them E F and G H represent portions of the main Shaft. In Fig. 1, I J is a stout Iron or Wooden post, fastened against the side of the wheel-house, directly over the main shaft On the upper part of this post, is fitted the moveable arm or crane N O, to the main shaft is fitted the bevel wheel S, and to the lower end of the rod a b, is fitted a corresponding wheel T. U is a small pinion on a b, which gears with the spur wheel, V, which in turns gives motion to the wheels, P and Q, and so revolves the lamp R. It will be seen that a Rotary motion is given to the lamp, when the main shaft is in motion and a b connected.

It can be disconnected by a lever, acting between the bosses X, which will elevate the rod in the guides Z Z Z.

Fig. 2 is another arrangement, for the same purpose. In this, K L represent a hollow Shaft, on which is firmly fastened, the arm L M, on which is the lantern. The hollow post is secured to the wheel-house by the straps K and B, and it can turn freely in them, the other part being the same in them as in fig. 1

The lever K W, when drawn down, will turn the frame in any required position around the Shaft c U. In fig. 1, the arm or crane N O, may be operated by cords from the wheel house, but in this device, the rod c U. does not lift up as in fig. 1, but in its place, the lower end is made square, and on it slides the short tube, d E, shown in fig. 3. The lower end of the rod turns on a bridge, f g, spanning the main shaft. On the upper end of the tube, d e, a lever is attached by means of boxes and collars as shown in fig. 4. This lever when raised carries with it the beveled wheel T, thus disconnecting the gearing apparatus.

ALBERT POTTS, Patentee,
PHILADELPHIA, Pa.



(View of F. Butts & Co.'s Coal Pier, Cleveland, O., on the Government and Cleveland & Pittsburgh R.R. Piers at the mouth of the Cuyahoga River, Lake Erie.)

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Gentlemen:—Yours of the 9th inst. is received. The "Sterling Coal" received from you during the past year worked very satisfactorily—averaging 9,520 cubic feet of 15 candle Gas per ton of 2,240 lbs., and 41 bushels of Coke weighing 1,465 lbs.

We consider it among the best of American Gas Coals, for the quantity and quality of the Gas produced, and also for the excellent quality of its Coke.

I am Gentlemen, Your Obedient Servant, CHARLES ROOME, President.

From the OGDENSBURGH GAS CO., Ogdensburgh, N. Y.

January 6, 1862.

Messrs. F. Butts & Co.—This Company has used your Sterling Coal since July, 1860. We consider it the best Coal we have ever used; gives us larger yields of Gas, requires less lime, and makes a superior Coke. Respectfully, Yours, R. E. GORDON, Sup't Og. Gas Works.

From the RONDOUT AND KINGSTON GAS LIGHT CO., Rondout, N. Y.

January 10, 1860.

Messrs. F. Butts & Co.—Gentlemen:—This Company have used your Coal nearly two years. It is in every respect satisfactory, and to it is given the preference over all other coals. Its average yield is 4 40.100. The light clear and strong. The Gas is easily purified and quite free from sulphur. The yield of Coke is large and of superior quality. It is, in my opinion, equal to any Gas Coal in the market. Very Respectfully, WM. W. HAGUE, Sup't.

From the SANDUSKY GAS CO., Sandusky, O.

January 6, 1862.

Messrs. F. Butts & Co., Cleveland.—Gentlemen:—We have used your Sterling Coal for two years and six months past, and find it superior in quality and all that a number one Gas Coal can be. The illuminating power of the Gas is high, the Coke is of a superior quality, and in many instances our monthly average product has been 4 40.100 per one lb. Coal. It gives us entire satisfaction. I am, Gentlemen, Yours, Respectfully, WILLIAM HUDSON, Sup't and Sec'y.

From the TOLEDO GAS LIGHT CO., Toledo, O.

Gents:—Your favor of the 28th inst. to hand and noted.

The Sterling Coal received from Messrs. Butts & Co., the last summer and fall, fully sustains the character it has as a Gas Coal, from previous use in our works. We think the quality of Gas is very good, a little better than that produced from the Coal had of them the year previous—yielding 8,666 feet per ton of 2,000 lbs., and 36 bushels of Coke of very good quality, well adapted to our use.

Respectfully, Yours, GEO. SPENCER, President.

From the BUFFALO GAS LIGHT CO., Buffalo, N. Y.

Messrs. F. Butts & Co.—The Sterling Coal we have had from you we find to be an excellent Gas Coal. The yield of both Gas and Coke is good. The illuminating power of the Gas is high and the quality of the Coke is very good. ROBERT ROBSON, Foreman Gas Works.

From the CLEVELAND GAS LIGHT & COKE CO., Cleveland, O.

Gentlemen:—This Company has used between 3,000 and 4,000 tons of your "Sterling Coal," and are still using it with very satisfactory results. We find the average product of a ton of 2,000 lbs. is about 8,800 feet of Gas, and about 37 bushels of Coke. The Gas is of good illuminating power and quite free from sulphur or other impurities, one bushel of lime purifying 9,000 feet, and the Coke of very superior quality.

The yield of Gas is about the same as from the Pittsburgh Coal, and the Coke is better adapted to our use. Yours, Truly.

T. DWIGHT EELLS, Secretary.

From the ALBANY GAS LIGHT CO. Albany, N. Y.

Messrs. F. Butts & Co.—Gentlemen:—We have been using your "Sterling Coal" at these works for two years, finding it all that is important in Gas-making Coal, as respect yield and quality of Gas, and freedom from sulphur—as much so as any of the Coaking Coal in use. We are disposed to contract for a further supply of the same quality.

Very Respectfully, PAUL A. SABBATON, Sup't.

From the TROY GAS LIGHT CO., Troy, N. Y.

Messrs. F. Butts & Co.—Gentlemen:—The Coal we have used for the past year at our works has been mostly "Sterling." It has given us full satisfaction in every respect.

S. S. DAUCHY, Sup't.

The following analysis of "Sterling Coal" was made by Prof. J. Lang Cassels, Professor in the Cleveland Medical College, who stands at the head of his profession as a chemist, and any statement made by him can be relied upon with safety.

Sp. gr.	1,288
Eygremaeric Moisture	1.85
Volative Combustible Matters	34.15
Coke (clear and porous)	64.00
	100
Fixed Carbon in the Coke	62.00
Ashes (yellowish white)	2.00
	64.00

COMPOSITION OF ASHES.

Silex	0.80
Alumini	0.45
Sulphate of Iron	0.75
	2.00
Per centage of Sulphur	0.23

J. LANG CASSELS, M. D.,
Prof. of Chemistry, Clev. Med. Col.

P. S.—The specimen from which the above analysis was made was taken by myself from a car load, and may be regarded as a fair average; in fact, this coal is very uniform in its characteristics. It also yielded 4 per cent. more gas than the Pittsburgh Coal. J. L. C.

We would also refer to Gas Companies in the following places:

New York City (Manhattan and New York Co.'s), Brooklyn, Albany, Troy, West Troy, Rochester, Oswego, Ogdensburgh, Lansingburgh, Newburgh, Rome, Palmyra, Geneva, Yonkers, Rondout, Kingston, Albion, Brockport, Seneca Falls, Elmira and Lyons, in State of New York; Cleveland, Toledo, Sandusky, Norwalk, Oberlin, Salem and Fremont, in Ohio; Detroit, Ann Arbor, Grand Rapids, Kalamazoo, Jackson and Adrian, in Michigan; Coburg, in Canada; Chicago, Ill., and two Companies in Milwaukee, Wisconsin.

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Five years experience in Mining, Sale and use of Sterling Coal, gives us full confidence in asserting there is no Coal that combines all the requisites so largely for a Gas or Smithing Coal as this.

This year we are several hundred yards further in the Mine than last season, and feel assured Sterling Coal will more than sustain the high reputation it has heretofore gained.

Our facilities largely increased for Mining and Shipping, we are prepared to supply the great demand for this Coal on a much more extensive scale.

Not being dependent upon high water for transportation, but receiving our Coal by RAIL, we are at all times prepared to fill orders, and ready to contract for delivery of the Celebrated Sterling Coal, on board Vessel or Cars at Cleveland, or at works of Gas Light Co's, in any of the Northern States or Canada.

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PATENT BITUMINIZED PIPES,

For the Conveyance of Water, Gas, and Drainage.

This important invention, patented by Mr. Charles Newbold, and now for the first time introduced to the public, may confidently be stated to be one of the greatest interest and commercial value, as the Patent Bituminized Pipes possess all the qualities necessary for the conveyance of Water, Gas, Sewage, Mine-Pumps, &c., viz.: great strength, great durability, and inoxidability, with the immense advantage of being about *one fifth* the weight of iron pipes, and about 35 per cent. cheaper; whilst, compared with lead pipes, the Bituminized Pipes are only about *one fourth* their price, without the possibility of the formation of the oxide and carbonate of lead, so dangerous for every purpose. They will stand 150 degrees of Heat, and after many trials it has been satisfactorily proved that rats or vermin will not touch them. They also withstand the action of all acids and salts

Iron pipes are at present frequently covered with a coating of bitumen or coal tar before they are laid down; but the adherence of this coating to the metal being very imperfect, on account of vibration and the difference of expansion, this preservation is insufficient, besides being exposed to a number of influences which neutralize its efficacy—galvanic currents materially assist the formation of oxides and deposits, which cause the obstruction and eventually the destruction of metallic pipes.

The Patent Bituminized Pipes are neutral, non-conductors of electricity, and consequently are not exposed to any of the deteriorating influences mentioned above. The process of manufacture of these Pipes consist in causing a roll of paper to pass through a reservoir of melted bitumen, after which it is tightly coiled around a mandril to any required thickness; and thus, when hardened, a tube is formed of perfect texture, great hardness, and enormous strength. These Pipes are proved, by hydraulic pressure, to resist a pressure of 220 lbs. to the square inch, equal to 506 feet head of water, which is more than double the altitude of the highest reservoir. The bituminous composition which unites and covers these Pipes is so well known as an excellent preservative, that it will be unnecessary to demonstrate that, when laid underground, the durability of the Patent Bituminized Pipes may be considered as unlimited. The Pipes are made in lengths of seven feet, and are connected by socket joints of the same material as the Pipes; or they can be fitted with iron flanged sockets, screwed together in a most simple and inexpensive manner.

For Gas these Pipes are invaluable; the Gas-lining which we insert effectualy resists the action of Gas, and being non-conductors, there can be no condensation in them, and the joints made with the Patent Cement are so strong as to entirely prevent Leakage.

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DIRECTIONS FOR JOINING THE PATENT BITUMINIZED PIPES.

Pack the pipes level in the ordinary way; slip the collar over one of the pipes; draw the ends close together and warm them by putting a hot iron between them; then press them together so as to make them adhere; take a piece of iron wire netting, about half an inch in the mesh, a little narrower than the length of the collar, and long enough to wrap once round the pipe, spread the collar over it and the joining; close the ends with clay; pour the melted cement into the manhole of the collar, and fill up the interior space; then remove the clay and the joint is finished.

It is necessary to leave a small vent hole in the clay at each end of the collar to allow the air to escape as the cement is poured in, that there may be no flaws or air bubles in it when cold. If in cooling the cement settles in the manhole, fill up again.

N. B.—The cement should be broken into small pieces and melted in a pot as you do lead, at a low temperature, until it is dissolved; it must be stirred while melting; then take it off and keep stiring it as it cools until it becomes nearly as liquid as water; then pour quickly.

All Orders should be addressed to

THE AMERICAN BITUMINIZED PIPE COMPANY,
OFFICE 24 WATER STREET, BOSTON, MASS.,
J. McGEARY, Agent;

or to FREDERICK W. BOND,
SOLE AGENT FOR NEW YORK,
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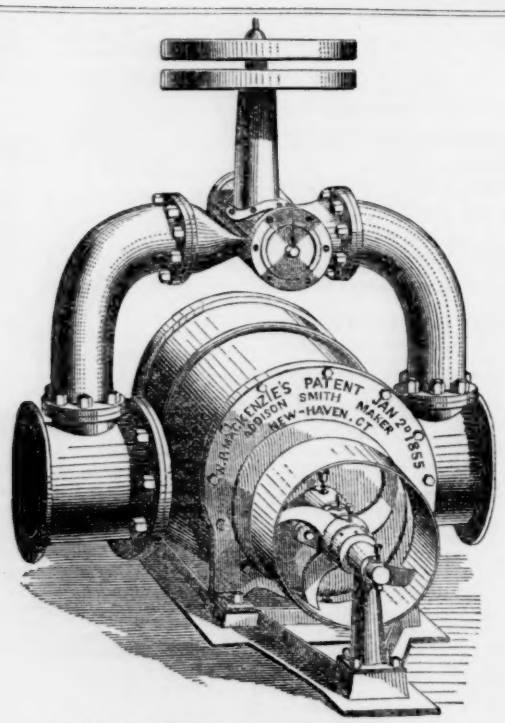
Cement for Joining, For Sale as above.



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They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

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It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

It is a perfect cover for all kinds of iron, tin, or wood-work, out-houses, and canvas coverings. It prevents and arrests the corrosion of metals, and is not affected by the action of salt, gases, acids, or ammonia.

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